

**MEDICAL RESEARCH COUNCIL  
OF SOUTH AFRICA**



**TELEMEDICINE  
RESEARCH CENTER**

**Private Bag X 385  
Pretoria 0001**

**Telephone: 012- 339 8500**

**Fax: 012- 339 8593**

**EVALUATION REPORT OF THE FIRST PHASE OF  
THE SA NATIONAL TELEMEDICINE SYSTEM (NTS)**

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**INQUIRIES:  
Dr. Sam Gulube  
PROGRAM DIRECTOR**

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**MEDICAL RESEARCH COUNCIL of SA  
TECHNOLOGY & BUSINESS DEVELOPMENT GROUP**

**Telemedicine Lead Program**

**Private Bag X 385**

**PRETORIA 0001**

**Republic of South Africa**

**E-Mail : sam.gulube@mrc.ac.za**

**Telephone No: (012) 339 8500**

**Fax No: (012) 339 8593**

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**10<sup>th</sup> October 2000**

**EVALUATION REPORT OF THE FIRST PHASE OF THE SA  
NATIONAL TELEMEDICINE SYSTEM (NTS)**

**1. INTRODUCTION**

Evaluation of the Telemedicine system involves establishing first whether this system is feasible in a given environment. Feasibility study answers the questions such as does the infra-structure exist for the system, are the people trained to be competent in the utilization, are the required procedures and protocols practical and can they be followed in practice. When the feasibility issues have been resolved then the issues of whether the service achieves what is designed to do follows.

This Telemedicine Evaluation Report was developed by the MRC Telemedicine Programme in co-operation with National Department of Health to assess the first phase of the South African National Telemedicine System (NTS), April 1999 to September 2000. The SA National Telemedicine System, which is the first of its kind in a developing country, was established to use Telemedicine as an efficient tool to improve primary care services in the rural areas of South Africa.

**2. OBJECTIVES**

The objectives of this Telemedicine Evaluation Report are to:

- Determine the utilization rate of the first phase of the SA National Telemedicine system
- Identify clinical impact of the Telemedicine system on the health care delivery to rural areas
- Identify practical administrative, technical and clinical measures to improve the performance of the Telemedicine System

### 3. THE PROCESS OF ESTABLISHING THE SA NATIONAL TELEMEDICINE SYSTEM

#### **Project Management**

In July 1998 the South African Department of Health convened a National Telemedicine Task Team to co-ordinate the introduction of Telemedicine into the delivery of health services in South Africa. The Task Team is composed of representatives of the Department of Health, MRC, Department of Communications and Telkom.

The first task of the Task Team was to develop a National Telemedicine Strategy Document that was adopted by the National Minister and Provincial Heads of Health in Pretoria in August 1998. **APPENDIX No: 1**

The programme of the Telemedicine system was developed by the South African Telemedicine Task Team. The activities of the Task Team are carried out under the auspices of the National Health Information System (NHIS/SA) Committee and the Principal Consultant to the DoH on NHIS/SA and TeleMedicine, Dr Salah H Mandil, Director-Advisor of WHO Health Informatics and Telematics in Geneva, Switzerland.

#### Technical Working Groups:

The 4 Technical Working Groups (TWG) established by the DoH for a term of 18 Months, June 1999 to Dec 2000, were:

1. Tele-Education Group
2. Telemedicine Protocols Group
3. Network Infrastructure Group
4. Legal Licensure and Ethical Framework Group

The Technical Working Groups have developed Guidelines for the implementation of the Telemedicine in South Africa that are to be reviewed by the National Telemedicine Conference before submission to the DoH for adoption. The following documents have been drafted by the TWG as proposed tools to guide the introduction of Telemedicine in South Africa:

- Telemedicine clinical Protocols
- Telemedicine policy guidelines on data ownership and security
- Telemedicine code of ethics and professional conduct
- Proposal for SA Medical Tele-education network
- Guidelines for the development of Telemedicine infrastructure network

#### British Aerospace Co. (BAe)/ Minister of Health MOU:

In accordance to the MOU signed between the MoH and BAe the Department of health invited the BAe Telemedicine Team to visit some of the selected South African Telemedicine sites in September 1999. The programme of the

visit included a DoH/BAe Telemedicine workshop where BAe offered to sponsor an establishment of the International Telemedicine Advisory Panel to facilitate introduction of Telemedicine In South Africa. The BAe is also sponsoring a scholarship for the DoH National Telemedicine Manager to undertake a one year course on Telemedicine Project Management at Loughsbrough University in the UK from Sept.2000 to Sept 20001.

### Forum of Provincial Telemedicine Coordinators

The Chairperson of NHISA (National Health Information System of SA), National Telemedicine Project Manager, the MRC Telemedicine Research Director and the Provincial Telemedicine Coordinators were constituted as a Forum of Provincial Telemedicine Coordinators in July 2000. The Provincial coordinators were encouraged to form Provincial Telemedicine Task Teams to facilitate the introduction of Telemedicine at the provincial level.

### **Implementation**

The National Telemedicine project is being implemented in 3 phases over a period of five years.

- ❖ **PHASE I** : April 1999 to March 2001 - 28 Pilot sites over 6 Provinces involving Teleradiology, Tele-ultrasound Ante-natal services, Telepathology, Tele-ophthalmology and the establishment of the National Telemedicine Research Centre.
- ❖ **PHASE II:** April 2001 to March 2002 - Involves the development an effective Telemedicine connection between **75-sites** divided into Various Provincial **NETWORKS** for management purposes.
- ❖ **PHASE III:** Aril 2002 to 2004, Additional sites as required and affordable to meet the rural healthcare needs. Transformation from Pilot stage to clinical and operational stage.

In April 1999 the Lebone Consortium in partnership with Siemens was selected by the DoH Telemedicine Tender Committee as the successful bidder to provide Telemedicine equipment for the 28 sites of the First Phase of the SA National Telemedicine System. Telkom is responsible for the installation of the ISDN Network, 2 Basic Rate (256 kbs) to the 28 pilot sites.

All 28 sites have videoconferencing and store and forward capabilities. The Telemedicine equipment was designed to support the following clinical applications:

## TELEMEDICINE SITES AND APPLICATIONS

PROVINCE	MODULE
<b>Eastern Cape 2 sites</b> <b>Umtata Hospital</b>  Lusikisiki	Tele-Pathology
<b>Free State 4 sites</b> <b>Universitas Hospital</b>  Harrismith Hospital Zastron Hospital Senegal Hospital	Tele-Radiology
<b>Kwazulu Natal 11 sites</b>  Edendale Hospital Madadeni Hospital Ixopo  <b>King Edward V111</b>  GJ Crooks Hosp Stanger Hosp Gandhi Hosp Kwadabeka Clinic Osindisweni Hosp Port Shepstone Hosp Phoenix Clinic	Tele-Ophthalmology        Ante-natal Tele-Ultrasound Services
<b>Northern Cape 2 sites</b> <b>Kimberly Hospital</b>  Kuruman Hospital	Ante-natal TeleUltrasound Services
<b>Mpumalanga 5 sites</b> Pretoria Academic Hosp. <b>Witbank Hospital</b>  Themba Hospital Ermelo Hospital Philadelphia Hospital	Teleradiology And Research Center
<b>North West 4 sites</b> <b>Klersdorp Hospital</b>  Bophelong Hospital Taung Hospital Lehurutshe Hospital	TeleRadiology
<b>PRETORIA NATIONAL DoH Site</b>	Project Management Centre

## Typical Equipment for the South African Telemedicine System

MediRad Advanced Acquisition Unit
LUMISYS Telerad scanner 75,
Framegrabber
MediRad Advanced Review
Archive server
Networking
READ/WRITE CD-ROM WRITER, ITEM 57
Extra Input sw x2
Modem x2
Additional Input x2
Poly-com VIDEO CONFERENCE VIEW STATION - 512,
TROLLEY
72 cm Television
AMD Ophthal, ENT & derm camera set
T-View Desktop Phone

### Training

After deploying the equipment to the Telemedicine sites, the Lebone Consortium conducted training from August to December 1999. The training was mostly technical involving aspects of how to operate the equipment. The users of the system were generally not satisfied with the quality of training received.

The National DoH and the MRC repeated the training at a number of sites as requested by the Provincial Telemedicine Co-ordinators. The MRC has developed a Draft Training Manual for the National Telemedicine System. The Draft is to be adopted by the National DoH and be implemented by the SA Medical Schools participating in the national Telemedicine pilot project.

### 4. METHODOLOGY

The Telemedicine implementation data is used for comparison, comparing the service delivered with the presence of the Telemedicine system to the service delivered in the absence of the Telemedicine system.

Three aspects of effectiveness of Telemedicine are usually evaluated.

- a) The effectiveness of Telemedicine in improving access to care by the disadvantaged communities.
- b) The effectiveness of Telemedicine in improving quality of care.
- c) The effectiveness of Telemedicine in lowering cost of care, usually referred to as cost-effectiveness of Telemedicine.

The evaluation process of the first phase involved the development of evaluation tools and methods to be used in assessing the contribution of

Telemedicine to the rural health care delivery in South Africa. The process included the development and testing of data collection instruments that are to be used in the evaluation of the whole implementation of the National Telemedicine system and in subsequent evaluation efforts.

This evaluation report involves data collection, began in January 2000 to September 2000. The report contains findings from all 6 provinces that participated in the first phase of the National Telemedicine System.

The clinical protocols for each of the Telemedicine applications to be implemented during the First Phase of the SA NTS, i.e. Teleradiology, Antenatal Tele-ultrasound Services, Tele-Pathology and Tele-Ophthalmology, were developed by the National Telemedicine Working Group.

## **APPENDIX No: 2**

The Telemedicine Technical Working Group also developed guidelines for Telemedicine Ethics and Telemedicine infrastructure roll-out in South Africa.

The MRC Telemedicine Research Program developed the Telemedicine evaluation methodology to be used in evaluating the impact of the implementation of the Telemedicine clinical protocols. A monthly Telemedicine Interaction Form was used to collect data on the volume and nature of Telemedicine encounters nationally.

## **APPENDIX No: 3**

A questionnaire was developed to explore the organizational factors at the pilot sites that aid or impede the successful development and implementation of the Telemedicine system.

A one page Telemedicine evaluation form was sent to all the receive sites of the participating provinces. Receive sites were defined as the Provincial referral Tertiary hospitals, where specialist expertise is based in each participating province. Send sites are defined as those primary and secondary hospitals and clinics that deliver primary care and require specialist support. The information collected through the evaluation forms and questionnaire included the following:

- Reason for Tele-consultation
- Diagnosis
- Case Disposition
- Alternative in Absence of Telemedicine
- User satisfaction
- Organizational factors that aide or impede Telemedicine
- Comments on Project Management



The national and provincial Telemedicine co-ordinators were requested to review and update the Telemedicine Interaction Form as needed. For nine months, from January to September 2000 the MRC collected the Telemedicine Interaction Form data manually.

In addition to the Telemedicine Interaction Form, data was collected through nationwide survey of Telemedicine sites, intensive site visits and telephone interviews, to investigate issues not readily expressed in the Telemedicine Interactive Form.

### **National Telemedicine Conference**

The Results of the First Phase of the SA NTS are to be reviewed by the National Telemedicine Conference organised by the DoH to be held in Johannesburg from 22 to 24 November 2000. The Conference will also discuss the Guidelines for the introduction of Telemedicine in SA developed by the Technical Working Groups. The Conference, which will be attended by delegates from the Southern African countries will also look into the development of a strategy for integrated SADC Telemedicine network.

## **5. RESULTS**

### **Project Management**

The survey on project management demonstrated a need for better communication between the national, provincial and local managers and users of the Telemedicine system. The main issue of concern was that when there is some technical failure, Siemens Co. representatives blame Telkom and vice versa. It always took a long time for technical problems to be resolved.

Many of the respondents expressed appreciation of the supportive service rendered by the national and provincial Telemedicine managers.

### **Tele-radiology**

The Tele-Radiology system was established to provide a Radiologist specialist reporting in the rural areas of Free State North-West and Mpumalanga provinces, where such services were not existent before. The system provides first and second opinion as well as a review of clinical cases for medical management. It provides specialist support to primary care doctors, especially the community doctors practising in the rural and remote areas of our country.

The users of the Tele-radiology system were not satisfied with the limitation in the reporting component of the software. The radiology specialist reports were sent back to the send sites by either fax or e-mail. They also felt that a request for consultation without history is meaningless. It is helpful if the referring clinician in his/her request for consultation, ask for a specific question requiring concise and brief answers, such as yes, no, can not rule out.

**FREE STATE TELERADIOLOGY Jan to Sept 2000 Data**

**Referral Tertiary Site: Universitas Hospital, Bloemfontein**

**Number and types of Tele-radiology Cases**

<b>Primary Site</b>	<b>Distance From Tertiary Site</b>	<b>Total Number of Radiology studies</b>	<b>Number of Tele-radiology cases</b>	<b>Types of Tele-radiology Cases</b>
Harrismith Hospital	300km	1 633	70	Head Trauma - 4 Chest Trauma - 3 Chest Disease - 4 Abdominal - 0 Spine - 4 Bone disease - 0 Upper/Lower Extrimity Trauma - 0 Paediatric - 0 Not specified - 55
Zastron Hospital	156km	1 484	86	Head Trauma - 0 Chest Trauma - 3 Chest Disease - 1 Abdominal - 1 Spine - 6 Bone disease - 4 Upper/Lower Extrimity Trauma - 5 Paediatric - 3 Not specified - 63
Senekal Hospital	163km	2 251	33	Head Trauma - 0 Chest Trauma - 1 Chest Disease - 8 Abdominal - 0 Spine - 5 Bone disease - 1 Upper/Lower Extrimity Trauma - 1 Paediatric - 0 Not specified - 17

From January to September the Free State Tertiary site, Universitas, reviewed about 189 consults from 3 send sites. The Radiology specialist report had to be sent back by phone and fax because the supplier's software did not have the capacity to send back the report electronically.

The majority of cases from Harrismith Hospital were related to head and spine trauma. Consults from Zastron Hospital were mostly related to trauma and pediatric cases. The majority of cases from Senekal Hospital were related to chest diseases and spine trauma.

The doctors doing their community service in the remote health facilities of Free State reported that the Telemedicine System improves their medical ability diagnose and manage various medical conditions particularly those related to trauma and chest diseases. They felt that the system was able to reduce the number of transfers. No transfer statistics were kept during this evaluation period.

During the survey the respondents indicated that many trauma patients complaining of neck pain were transferred unnecessarily because of inability to clear cervical spines x-rays by the primary care providers. Now with the Tele-radiology system primary care providers are able to institute appropriate management their community health facilities without having to transfer the patient to the urban Tertiary centers. One case of a walk-in traumatic cervical spine dislocation was diagnosed within few minutes using the system and the patient was immediately immobilized and transferred thereby avoiding further injury.

Three trauma patients had cervical abnormalities that were not initially recognized at the remote sites. The diagnoses was made by the specialist radiologist and appropriate management was instituted. One patient had a Thoracic spine fracture and through Telemedicine consultation the doctor was able to manage the condition without transferring the patient. The Provincial Tertiary institution has requested that, for the time being, all trauma spine x-rays from the Telemedicine site must be cleared by the specialist radiologist. The current practice is that, the x-rays are cleared by the primary doctor in charge and specialist consult is requested as needed.

The clinicians in the remote areas of Free State felt that more transfers to the tertiary Bloemfontein site can be avoided if comprehensive Telemedicine training is provided particularly in the use of video-conferencing unit. They also felt that the system would be more cost-effective if the radiologists, neurosurgeons and other specialist specialists are regularly available for Telemedicine consults at the Tertiary site.

## NORTHWEST TELE-RADIOLOGY Jan to Sept 2000 Data

### Referral Tertiary Site: Klerksdorp Hospital

#### Number and types of Tele-radiology Cases

Primary Site	Distance From Tertiary Site	Total Number of Radiology studies	Number of Tele-radiology cases	Types of Tele-radiology Cases
Mafeking-Bophelong Hospital	152km	11 927	113	Head Trauma - 1 Chest Trauma - 1 Chest Disease - 36 Abdominal - 1 Spine - 0 Bone disease - 0 Upper/Lower Extrimity Trauma - 0 Paediatric - 0 Not specified - 74
Lehurutshe Hospital	167km	2 780	105	Head Trauma - 2 Chest Trauma - 2 Chest Disease - 47 Abdominal - 1 Spine - 0 Bone disease - 4 Upper/Lower Extrimity Trauma - 3 Paediatric - 1 Not specified - 45
Taung Hospital	203km	7 076	46	Head Trauma - Chest Trauma - Chest Disease - Abdominal - Spine - Bone disease - Upper/Lower Extrimity Trauma - Paediatric - Not specified -

The province started collecting information on the Tele-radiology activities in February 2000. The Taung Hospital continued to experience technical problems, electrical fluctuations and disruption of software function. This hospital only started clinical utilisation of the system in August 2000. The majority of cases from the Mafeking-Bophelong Hospital and Lehurutshe Hospital were related to chest diseases.

The community service doctors in the province found the Teleradiology system highly valuable in improving their clinical knowledge and ability of diagnosing and managing various chest diseases. The system enabled them to differentiate between chronic cavitary TB lesions and occupational lung diseases such as asbestosis and lung cancers. A number of transfers were avoided by enabling the doctor to correctly diagnose the lung disease rather than transfer the patient because of uncertainty about the diagnosis. The system was also found useful in diagnosing and managing recurrent and complicated pneumothoraces.

The system was noted to be useful in detecting bone tumours from symptomatic patients. Some of the symptoms that were thought to be from arthritis were found to be from bone tumours requiring change of management.

The clinicians felt that more Telemedicine training was required to make the system more efficient. They are interested in piloting abdominal and paediatric Tele-ultrasound services.

The Teleradiology system has also enabled the doctors at the remote sites of the province to do retrograde urethro-cystograms (Urinary Bladder studies) to trauma patients suspected of urethral and internal pelvic injuries.

## MPUMALANGA TELE-RADIOLOGY Jan to Sept 2000 Data

**Referral Tertiary Site: WITBANK Hospital**  
**Extended Specialist Site: Pretoria Hospital**

### Number and types of Tele-radiology Cases

Primary Site	Distance From Tertiary Site	Total Number of Radiology studies	Number of Tele-radiology cases	Types of Tele-radiology Cases
Philadelphia Hospital	70km	10 157	25	X
Ermelo Hospital	103km	4 500	10	X
Themba Hospital	198km	16 582	X	X

Many of the potential Tele-Radiology applications for Telemedicine in the Mpumalanga Province were not fulfilled, because of the limitations of the Tele-communication infrastructure in the province.

### Antenatal Tele-ultrasound Service

The Tele-Ultrasound Antenatal application for the first phase of the National Telemedicine system was designed to move the pre-natal ultrasound services from the provincial referral center to the primary care center in the remote and rural pre-natal community health centers. The purpose of the application was to:

- Train health care providers in the use of ultrasound service for pre-natal care
- Tele-consultation for prenatal.
- Provision of diagnostic and management services for complicated pregnancies.

The prenatal ultrasound service is viewed by the public health managers as a key tool to improve prenatal care and reduce infant mortality rate in South Africa.

The selection of Tele-Ultrasound sites to participate in the first phase was based on the availability of ultrasound services in community centers for pre-natal care and the absence of specialist care, requiring transfer of patients from the community centers to the provincial referral center.

The clinicians at Port Shepstone indicated they now have Obstetrician specialists and therefore do not need a Telemedicine system for consulting King Edward Hospital. They felt that the system should be useful to other services such as mental health and trauma services.

### Number and type of cases for Northern Cape Antenatal Tele-Ultrasound Service

Provincial Tertiary Hospital	Primary/ Secondary Site	Distance	Number of Cases	Type of Cases
<b>Kimberly Hospital</b>	Kuruman Hospital	200km	9	<ul style="list-style-type: none"> <li>▪ Threatened Abortion</li> <li>▪ Neural defect</li> <li>▪ Large Ovarian Cyst</li> <li>▪ Hydrocephalu</li> </ul>

The Northern Cape Tele-Ultrasound Antenatal care system started operating in June 2000. From June to August about 9 Antenatal care Tele-ultrasound consultations were performed between Kuruman and Kimberly and 4 transfers were avoided due to Telemedicine system. No clinical activity in September because of rotation of community service doctors. In addition to the Telemedicine system, the province is operating a Flying doctors programme where once a month, specialists from Kimberly fly to Kuruman for clinical consultations. The clinicians are of the opinion that the Telemedicine system has a potential of saving cost on the Flying programme.

### Kwazulu-Natal Antenatal Tele-ultrasound Sites and distances and type of cases:

Provincial Tertiary Site	Primary/Secondary Sites	Distance from Tertiary site	Types of cases tested
<b>King Edward Hosp</b>	GJ Crooks Hosp Stanger Hosp Gandhi Hosp Kwadabeka Clinic Osindisweni Hosp Port Shepstone Hosp Phoenix Clinic	50km 67km 19km 15km 30km 110km 20km	<ul style="list-style-type: none"> <li>▪ Neural tube defect</li> <li>▪ Abdominal wall defect</li> <li>▪ Congenital heart defect</li> <li>▪ Hydrocephalus</li> </ul>

The Departments of Obstetrics and Gynaecology at the University Tertiary site and the provincial management have made arrangements for regularly scheduled Telemedicine Antenatal care clinics for the participating Telemedicine sites in KwaZulu-Natal. Between June and September 2000 clinical testing of the system was conducted.

During the testing period about 30 cases of antenatal Tele-ultrasound were reviewed. The reason for selection of cases was mostly for the purposes of antenatal ultrasound training of primary care providers by the obstetrician specialist. About 12 cases that would have been transferred for further investigation were managed locally without transferring the patient to the Tertiary site.

### **Eastern Cape Tele-pathology:**

Few Tele-pathology consultations tests were performed during the months of May and June in the Eastern Cape, with some technical difficulties. No clinical activity took place during July and August because of unavailability of specialist at Umtata.

<b>Provincial tertiary site</b>	<b>Primary/Secondary site</b>	<b>Distance</b>
<b>Umtata Hospital</b>	Lusikisiki Hospital	80km

Technical problems noted by the clinicians using Telepathology in the Eastern Cape include:

- The MediRad software application is limited in its Tele-pathology capabilities. The space for patient history and presentation is limited to approximately 60 characters and is inadequate for sending appropriate background information for most cases.
- Because of the limited options for saving images, it is not possible to send studies over the Internet using email attachments or other file transfer protocols, necessitating the use of a direct modem or ISDN connection between the sending computer and the receiving computer. This can be quite costly.

### **Tele-ophthalmology**

The KwaZulu-Natal Tele-Ophthalmology system is the next to be deployed as part of the first phase of the National Telemedicine system. The system is expected to start operating Jan 2001



## 6. DISCUSSION

The findings of this evaluation report confirmed many issues previously identified by other Telemedicine pilot studies conducted internationally relating to technical and organizational challenges of introducing Telemedicine. Almost all of the sites evaluated here have operated for less than 9 months. About 5 out of 28 sites (17.8%) were still experiencing serious technical problems 9 months into the operational stage. The limited time period of operation may in part explain the relatively low utilization figures reported on this evaluation report. According to the world literature, most of the Telemedicine systems that were able to survive and grow, usually experience higher utilization after the second year of operations.

It is important to emphasize that Telemedicine is not a substitute for face-to-face medical practice, but rather it is a tool to compliment the current health care delivery in South Africa. All community service doctors interviewed during this evaluation period indicated that the Telemedicine system was very valuable in decreasing the professional isolation usually felt by junior doctors that are practicing in the remote areas.

Certain questions in the Telemedicine evaluation forms were problematic and were actually not answered as requested. The respondents did not indicate what they would do if the Telemedicine was not present. The precise reason for Telemedicine consult was usually not indicated.

This evaluation demonstrated that until recently, most of the provinces were not collecting data on patient transfer from one health institution to another. Even current information on patient transfer does not usually indicate diagnosis or reason for transfer.

Because of inadequate data collection during this evaluation period it is not possible to compare the number of patient transfers before and after Telemedicine introduction. The subsequent evaluation instruments should improve data collection on the referral pattern in the provinces.

Qualitative data collected from the users of the SA NTS demonstrated the following benefits of the system:

- Access to specialist radiologist reporting within an hour compared to 5 to 7 days delay when x rays are transported by ground transport.
- Increased competence of primary care providers in interpreting radiographic studies.
- Improved the ability of community service doctors to diagnose and manage various medical conditions particularly those related to trauma and chest diseases.

- Reduced professional isolation usually felt by the junior medical doctors performing community services in the rural health facilities of South Africa.
- Reduction of unnecessary transfers from rural to Urban Tertiary Centers.
- The clinicians noted the opportunities for education and training at every level of health care providers (doctors, nurses and medical students).
- They felt that within limits that can be improved by developing appropriate protocols, other medical specialties should be able to make use of such a Telemedicine facility.

## 7. COST BENEFIT ANALYSIS

Please note that the following is an unaudited reflection of expenditure of the First Phase of the Telemedicine system.

### Telemedicine Equipment Cost :

SITE	Number of sites	COST
Free State	4	R 2 012 523
North West	4	R 2 025 561
Mpumalanga	4	R 2 007 580
Eastern Cape	2	R 871 641
Northern Cape	2	R 701 368
Kwazulu-Natal - Ophthalmology	3	R 1 526 499
Kwazulu-Natal - Ultrasound	8	R 1 398 812
National - Civitas	1	R 1 344 114
<b>Sub Total</b>	<b>28</b>	<b>R 11 888 098</b>

### Telemedicine ISDN Line Installation Cost :

SITE	COST
Free State	R 3 463.36
North West	R 3 463.36
Mpumalanga	R 4 329 20
Eastern Cape	R 1 731.68
Northern Cape	R 1 731.68
Kwazulu-Natal -	R 9 524.24
<b>Sub Total</b>	<b>R 24 243. 52</b>

### Telemedicine Transmission Cost per Province: January – September 2000

Province	Rental	Calls
Kwazulu – Natal	R 41536-44	R 6740-60
Mpumalanga	R 16417-91	R 15104-16
Freestate	R 15104-16	R 19095-92
Northwest	R 15104-16	R 21733-76
Eastern Cape	R 7552-08	R 6025-72
Northern Cape	R 7552-08	R 1445-61
<b>Sub totals</b>	<b>R 103 266-83</b>	<b>R 70 145-77</b>

Cost effectiveness concerns the relationship between project input such as equipment cost and transmission cost and project outcomes. Most of the time the outcomes are not quantifiable and can not really be converted into rands and cents. The comparison in this evaluation study is between the Telemedicine system and the system in the absence of Telemedicine. In some parts of the country, the Telemedicine pilot was undertaken without a comparable system, because Telemedicine was used to provide a service that was not available before, while in other parts Telemedicine was used to improve the quality of care.

Since the majority of the majority of the 28 national Telemedicine sites have only been operating clinically for less the three months it is too early to make conclusions on cost benefit analysis.

## **8. LESSONS AND RECOMMENDATIONS**

### **Lessons:**

1. It took longer time than expected from the selection of the preferred provider to actual installation and testing of the equipment at various sites.
2. In selecting a partner to provide Telemedicine Technology, it should be recognised that no single supplier has all the technology necessary to meet the defined clinical needs of a particular healthcare environment. Although one supplier was selected for Phase I, more work still needs to be done to customise the system to meet the various clinical needs.
3. It takes a tremendous effort and time to get the clinicians to actually start integrating the Telemedicine system into their clinical, educational and administrative practices. For any Telemedicine project to succeed the Telemedicine system must be integrated into the existing healthcare environment.
4. Comprehensive Training on Telemedicine to include Telemedicine knowledge, technical, management and clinical aspects is critical for enhanced technology integration into health care and management services.
5. Some of the clinical specialists are expressing concern about the possible effects of the system on their practice. How are they going to cope with additional consultations that might come with the system? The Telemedicine system should not disrupt the normal referral pattern but should, instead make it more efficient and cost effective.
6. In implementing a Telemedicine system, an establishment of various national provincial and local multi-disciplinary Telemedicine Task teams plays a major role. The management style of these task teams must encourage an approach that will allow the clinicians to drive the process and be focussed on clinical outcomes.

7. The sharing of information about the development of Telemedicine, whether positive or negative, through workshops and conferences is critical in designing a sustainable Telemedicine system.
8. It is important to develop Telemedicine sustainability strategies very early in the process of planning. The sharing of resources and financial risks with other national and local providers of social services like education, safety and security, to remote areas is important when planning for a sustainable Telemedicine system

### **Recommendations:**

- 1 The Forum of Provincial Telemedicine Co-ordinators and the Provincial Telemedicine Task Teams to organise regular meetings of local clinicians, managers, academics and technicians to resolve technical, management and clinical problems, as they arise.
- 2 The DoH/MRC National Telemedicine Research Centre to collaborate with the WHO Health Informatics and Telematics Division in establishing a Telemedicine Centre of Excellence in Southern Africa in order to strengthen its Telemedicine evaluation and research capacity.
- 3 The primary care providers and consultants should be requested to record their opinions on limitations and benefits of the Telemedicine interactions, which could be discussed at regular Provincial meetings.
- 4 A comprehensive Telemedicine Training programme to be developed by the DoH, MRC and SA Medical Schools participating in the national Telemedicine pilot project. Such a course might have to be provided two to three times a year because doctors doing community service in the rural public health facilities usually rotate every six months.
- 5 A Sub Committee on Telemedicine Clinical Protocols be established to co-ordinate implementation of protocols and integration of Telemedicine and other health Technology into the South African healthcare system.
- 6 The provincial health departments are encouraged to appoint Provincial Telemedicine managers to spend more time with the clinicians and managers in collecting useful information on patient transfers, as well as in co-ordinating the integration Telemedicine technology into the Healthcare MIS and delivery of healthcare services in the Province.
- 7 Unreliable Telkom ISDN Lines, Poor e-mail access, and limited capacity of electronic patient record in the software are the major concerns raised by the users of the First Phase of the National Telemedicine System. It is recommended that the National Project Manager organise regular meetings between provincial Telemedicine Managers, the technicians and the clinicians who are using the system to review ways and means of improving the technical, administrative and clinical performance of the system.

- 8 The Provincial Telemedicine managers to establish internal Telemedicine evaluation teams to monitor the overall performance of their systems.
- 9 The MRC to collaborate with national and provincial health departments in customising the electronic collection of Telemedicine evaluation data from the Telemedicine sites.
- 10 Agreements with future Technology suppliers should ensure that one party is responsible for the functioning of the whole system to avoid a situation where Telecommunications supplier blames the Telemedicine equipment supplier and vice versa.
- 11 Overall the Telemedicine system is already beginning to make a positive impact on the delivery of health and clinical education in the participating provinces. The deployment of infrastructure and equipment to the 28 sites of the first phase by the Consortium took longer than expected and a number of the sites are still experiencing technical difficulties a year after installation of the system. It is recommended that the Second Phase of the National Telemedicine system be implemented in stages, province by province starting with those that are operating efficiently. Strategies should be developed to make the system as much vendor independent as possible by ensuring that it adhere to agreed upon Telemedicine standards.

## **9. CONCLUSION**

The purpose of Telemedicine evaluation is to assess the systems management, the technical and the clinical impact of Telemedicine on the access to specialised care by the patients in rural areas, particularly women and children in support of primary health care (PHC) services. The appropriate use of Telemedicine ‘ tools’ and instruments such as protocols and guidelines is essential for the system to have any impact on the healthcare delivery. If protocols are not implemented then the system will have no impact. Rigorous evaluations of Telemedicine will encourage widespread use of some applications that improve PHC services and discourage adoption of others, at least until technologies or infrastructures improve or other circumstances change.

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The End.