

# 2<sup>nd</sup> South African Telemedicine and eHealth Conference & 16<sup>th</sup> ISfTeH International Conference

*“Prove your Hypothesis!”*

14 - 15 September 2011  
Cape Town,  
South Africa



science  
& technology  
Department:  
Science and Technology  
REPUBLIC OF SOUTH AFRICA



# Connecting Communities for Self reliance

**Ms Eunice Maluleke**  
**GM: MTN SA Foundation**  
South Africa  
Contact: [Malule\\_e@mtn.co.za](mailto:Malule_e@mtn.co.za)



MTN Foundation



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# MESSAGE

## THE ORGANISING COMMITTEE

We would like to welcome all our dignitaries: The Deputy Minister of Health, Dr Gwen Ramokgopa; The Deputy Minister of Science and Technology, Mr Derek Hanekom; and The Deputy Minister of Communication, Mr Obed Bapela. Thank you for your continued support to Telemedicine and mHealth. This year, we take great pleasure in welcoming all guests, sponsors and delegates.

The Southern African Telemedicine conference has extended its reach in 2011 and now includes eHealth and other relevant areas such as e-Learning, mHealth and innovation. Our partner, ISFTeH, is also hosting its 16th International Telemedicine & eHealth Conference with its SA partners this year.

This year's conference is significant as not only does it have important academic components, but it also has a very strong presence from the government. The government's role is extremely important as it guides all stakeholders and role players in the future direction of Telemedicine and eHealth. The academic component of the conference ties in closely with the theme 'prove your hypothesis'. Prove your hypothesis relates to the presentations of research findings in the area of Telemedicine & eHealth. A stringent peer review process was followed and the conference proceeding includes quality papers based on sound research methodologies.

The research presented in this conference is very valuable as it informs the next stage of the process in solidifying the Telemedicine & mHealth; eHealth environment, which is policy development. South Africans can now look forward to policy development in telemedicine, which will help to move from research to sustainable solutions that will help to ensure that healthcare is delivered in an efficient, effective manner.

We hope that guest and delegates learn from this conference and that they have a memorable enjoyable experience.

## KEYNOTE SPEAKER



*Prof Richard E. Scott, PhD*

*Director, Office of Global e-Health Strategy*

Dr. Richard E. Scott is Director, Office of Global e-Health Strategy, and an Associate Professor in the Global e-Health Research and Training Program, University of Calgary. He is also a Canadian Harkness Associate (2004-2005), and a Fulbright New Century Scholar (2001-2002) alumnus; experiences that opened his policy and global e-health perspectives, respectively.

Richard focuses his interests on examining the role of e-health in the globalisation of healthcare, including aspects impacting the implementation and integration of e-health globally and locally ('glocal' e-health). He promotes the application of 'culturally sensitive and technologically appropriate' e-health solutions, and is pursuing collaborative research, capacity building, and implementation activities with colleagues in European, Asian, Australasian, African, and Latin American and Caribbean (LAC) countries.

Dr. Scott views e-health broadly, as the use of any information and communications technology (ICT) to mediate health, healthcare, health education, or health research. A one-time Royal Navy Commando helicopter pilot, Richard has over 30 years of healthcare and research experience from Canada, the USA, and the UK; as a medical laboratory technologist, biochemist, clinical chemist, toxicologist (clinical, forensic, environmental, and occupational), Director of Research (for a large hospital corporation), and over 14 years as an e-health researcher. His focus is on finding practical ways to address issues that stand in the way of real-life implementation of appropriate and sustainable e-health solutions.

His research program and interests are directed towards inter-jurisdictional e-health policy (management and facilitation of the complex interactive trans-border environment of glocal e-health), strategic implementation (developing needs- and evidence-based, and defensible e-health strategies to guide countries and facilities in the introduction of appropriate e-health solutions to address current and future needs), outcomes and evaluation (identifying and defining suitable outcome indicators and developing tools and frameworks for rigorous yet pragmatic demonstration of the value of e-health), 'disaster life-cycle' response (understanding and promoting the role of e-health in facilitating all stages of the disaster life-cycle), and environmental e-health (a new area of research spawned by Richard in 2003 to understand the environmental costs [e.g. e-waste] and benefits [e.g. reduced greenhouse gas and particulate emissions] of e-health).

Internationally, Dr. Scott is a member of the U21 Global e-Health Committee, and Chairperson of the WHO GOe-U21 Global e-Health Policy Committee. He has acted as an expert advisor and reviewer for many international initiatives. Richard has also provided, and continues to provide, expert opinion and active support to national, provincial, and territorial governments, agencies, and healthcare programs in relation to evaluation, outcomes, policy, and strategy. Dr. Scott was a Founding member of the Canadian Society of Telehealth (CST) in 1998 (now the Canadian Telehealth Forum (CTF)), President of CST (2004-2006), and is Chairperson of the CTF's International Special Interest Group.

## PLENARY SPEAKER



*Dr Moretlo Molefi*

*Managing Director, Telemedicine Africa PTY(LTD)*

Dr. Lynette Moretlo Molefi is a South African medical doctor, a dynamic and versatile entrepreneur and business executive, with a reputation for exemplary leadership. She has been one of the few pioneers of telemedicine in South Africa and Africa with representation at various levels of government and nongovernmental organizations.

To recap a remarkable career she has recently been invited as non executive director for Sunpa Yunnan in China.

Born in historic Soweto, she grew up in Lesotho where she completed her early education. She achieved a BSc degree at Roma University in Lesotho and went on to read for her MBChB at the Medical University of South Africa (MEDUNSA) where she qualified as a medical doctor. She practiced as a community doctor for a number of years as well as working for major pharmaceutical companies such as Adcock Ingram, Upjohn Pharmaceutical Company and Aspen Pharmacare Africa before entering into the field of business. Currently she holds executive positions at Telemedicine Africa PTY and Sunpa Africa PTY. She also serves as a board member of HCI, a JSE listed company; The International Society for Telemedicine and eHealth; ETV, South Africa's first free-to-air commercial television station; Business System's Group Africa, and business and software company; Syntell, a leading blue chip company providing technology based services for Road Safety, Traffic Management and Revenue Collection and Unigas.

Dr Moretlo Molefi is a dynamic medical practitioner who has used her undergraduate training as a platform to combine her business interests with a keen interest in e-Health. She served as Director for Telemedicine Research at the Medical Research Council (MRC) of South Africa for 7 years. The Telemedicine unit was established as a joint project of the Department of Health and the MRC and has gone a long way in delivering a solution to the severe problem of inadequate services and geographical challenges which confound the South African health system – a result of long-standing, previously misplaced priorities. Her contribution to the MRC is second to none, and as a result she continues to consult to the MRC on the implementation of a virtual hospital network involving 18 hospitals in one of the provinces in SA. She was also Project Leader in the development of the Telemedicine Workstation for developing countries for which the MRC has paid her an inventors fee, Monitoring & Evaluation of the Health Channel, and Poverty Alleviation study for the Dept. of Science & Technology focusing on telemedicine, Multi Drug Resistant Tuberculosis project, Testing and Evaluation of Telemedicine technology for Defence Institute, Mobile Pathology Lab. Having recently set up an eHealth consultancy business focusing on eHealth programme management, distance medical services and Telemedicine consulting, she has dedicated most of her time on the development of eHealth solutions for developing countries as well as giving strategic guidance in creating and implementing eHealth services both for clinical and educational purposes.

She has pioneered ICT –based systems that support all levels of healthcare including primary healthcare and tertiary care, one example being a successful rural connectivity pilot on Telemedicine in Partnership with Motorola and the State Information Technology Agency using wireless systems in Limpopo province. This project has now been extended to 14 regional hospitals covering the entire province. She is currently working on a tele-health assessment project for tele – surveillance in 14 Southern African countries, a project funded by the African Development Bank. She coordinates the international Telemedicine training in China on an annual basis for at least 20 participants from developing countries, funded by the Chinese Ministry of Science and Technology.

Dr Molefi's leadership abilities can be evidenced in the number of leadership positions she has undertaken both in South Africa and across the globe. In South Africa, she serves in the Presidential National Commission, is the secretary for Zenzele Healthcare, a nongovernmental organisation. She is a member of the South African Medical Association SAMA as well as the Health Professions Council of South Africa (HPCSA).

Globally she is a coordinator within the NEPAD-e-Africa Commission on e-Health, is strategic adviser to the World Health Organization (WHO) on Global Observatory on e-Health European Union Telemedicine Task Force and the only woman to sit on the board of the international society for telemedicine and e-health.

Dr Molefi's success has been built on a solid work ethic, a belief in the power of technology, and an unwavering insistence that business must do good to do well.

# CONFERENCE COMMITTEE

## PEER REVIEW PANEL

*Thank you to the members of the Peer Review Committee  
who contributed to the quality of this conference.*

Dr Sinclair Wynchank Consultant

Ms Jill Fortuin Acting Director: Telemedicine at MRC

Mr Frank Lievens International Coordinator, Med-e-Tel

Prof Tony Bunn Director: MRC Innovation Centre

Mr Brian Goemans Manager, Medical Devices to Market at Cape Biotech

Ms Miekie Treurnicht MScEng (Industrial) Student at Stellenbosch University

Prof Maurice Mars Professor and Head of Department of TeleHealth

Dr Peter Benjamin Managing Director: Cell-Life

Ms Liezl van Dyk Senior Lecturer (Industrial Engineering) at Stellenbosch University

Mr Dirk Kotze Business Analyst, Medi-Clinic

Dr Thys Kruger Managing Director at Medcare Networks

Dr Ethelwynn Stellenberg Health Science Faculty, Stellenbosch University

Dr JP Bosman Senior Adviser e-Learning at Stellenbosch University

Dr Glynis Pickworth Educational Advisor, Faculty of Health Science, University of Pretoria

Mr Deon Nel IT Architect at SITA

## ORGANIZING COMMITTEE

Ms Jill Fortuin Abrahams, Medical Research Council

Ms Liezl van Dyk, Industrial Engineering, Stellenbosch University, South Africa

Ms Mandy Salomo, Medical Research Council

## EXHIBITORS



**MRC Telemedicine:** Facilitate constructive interaction between researchers, scholars, practitioners, developers, funders and users of telemedicine, through communication and the facilitation of initiatives and opportunities as well as the dissemination of research results. Build research capacity by introducing engineers and technicians to the science of healthcare and by introducing healthcare practitioners to relevant technology. This is done through the incorporation of telemedicine topics in the existing curricula of post graduate programmes, certificates and research programs. Render various telemedicine clinical services as well as technical support and maintenance services.

**Company contact info:**

Tel: +27 21 938 0856

Email : [jill.fortuin@mrc.ac.za](mailto:jill.fortuin@mrc.ac.za)

Web : [www.mrc.ac.za](http://www.mrc.ac.za) / [www.satelemedicine.co.za](http://www.satelemedicine.co.za)



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**Company contact info:**

Tel: +86 335 8015427/8015425

Email: [contec\\_wendy@hotmail.com](mailto:contec_wendy@hotmail.com) / MSN: [contec\\_wendy@yahoo.com.cn](mailto:contec_wendy@yahoo.com.cn)

Website: <http://en..contec365.com>



**Telemedicine Africa** has been driven by the philosophy to provide integrated, multifunctional, scalable and future proofed solutions and products. We have taken up an holistic approach- offering high quality, cost effective health care services, supplies and solutions using appropriate state of the art technologies, while providing the necessary training, maintenance, support and connectivity to ensure that these services become self sustaining at the local level.

**Company contact info:**

Tel: +27 11 023 8849

Email: [molefi@telemedafrica.co.za](mailto:molefi@telemedafrica.co.za) / [saskia@telemedafrica.co.za](mailto:saskia@telemedafrica.co.za)

Website: [www.telemedafrica.co.za](http://www.telemedafrica.co.za)





**AMD Global Telemedicine** is the worldwide leading supplier of telemedicine technology, devices, and application software for both live telemedicine encounters and deferred consultations. AMD offers the market's preeminent diagnostic medical devices and tConsult™ Encounter Management Software. AMD has over 6,300 installations in 81 countries and delivers solution design, turnkey installation, and training for telemedicine programs across the globe.

**Company contact info:**

Tel: +978 937 9021

Email: [info@amdtelemedicine.com](mailto:info@amdtelemedicine.com) [www.amdtelemedicine.com](http://www.amdtelemedicine.com)

Website: [www.amdtelemedicine.com](http://www.amdtelemedicine.com)



**RemoteA Ltd** offers easy to use and cost-efficient solutions for simplifying the diagnosis of some common medical disorders like sleep apnoea and cardiac arrhythmias. The RemoteA telemedicine system has been utilized so far for more than 40,000 patients in more than 150 primary care locations in three European countries.

**Company contact info:**

Tel: +358 45 2300 520

Email: [remotea@remotea.com](mailto:remotea@remotea.com)

Website: <http://www.remotea.com>



**Nethealth Solutions:** Our Core business is to supply and support PACS/RIS solutions. We are currently running a big project in 23 Eastern Cape hospitals. We are also in the market of Telemedicine and have developed a number of telemedicine solutions. We are also, in conjunction with Dedalus, busy with a national patient management system

**Company contact info:**

Tel: +27 43 748 3503

Website: [www.paxeramed.com](http://www.paxeramed.com)

## DAY 1, 13 SEPTEMBER

- 16:30 – 17:30**      **GOVERNMENT’S ROLE IN TELEMEDICINE & MOBILE HEALTH**  
**Chair:** Prof Lizo Mazwai, Chairperson of the Board, South African Medical Research Council (SA MRC)
- Dr Gwen Malegwale Ramokgopa**  
Deputy Minister of Health, South Africa
- Mr Obed Bapela**  
Deputy Minister of Communications, South Africa
- Mr Derek Hanekom**  
Deputy Minister of Science & Technology, South Africa
- Prof Ali Dhansay**  
Acting President of South African Medical Research Council (SA MRC)
- Prof H Russel Botman**  
Rector and Vice Chancellor of Stellenbosch University
- 17:30 – 18:00**      **PANEL DISCUSSION**
- 18:00 – 18:10**      **THANK YOU**  
Mr Zukile Vokwana  
Executive Director, South African Medical Research Council
- 18:10 – 19:00**      **COCKTAIL DINNER**

## DAY 2, 14 SEPTEMBER

### OPENING SESSION

- 08:30 – 08:40**      **WELCOME ADDRESS**  
**Chair:** Prof A Dhansay
- Prof Lizo Mazwai,  
Chairperson of the Board, South African Medical Research Council (SA MRC)
- 08:40 – 08:50**      Making health care more accessible: Efforts from Department of Science and Technology  
Ms Glaudina Loots, Department of Science and Technology, South Africa
- 08:50 – 09:00**      The role professional associations in the organization of eHealth in countries  
Prof Yunkap Kwankam, International Society for Telemedicine and eHealth (ISfTeH)
- 09:00 – 09:10**      The use of ICT Platform to Bridge Socio-economic Gaps: A strategic Public Private Partnership Approach  
Ms Eunice Maluleke, Head, MTN SA Foundation
- 09:10 – 09:20**      Telemedicine: Defining the Regulatory Perspective  
Ms V Moodley, Health Professions Council of South Africa (HPCSA)

**09:20 – 09:50**

**KEYNOTE ADDRESS**

The Impact of Telemedicine in Developing Countries: The Evidence  
Prof Richard Scott, Global e-Health Strategy

**09:50 – 10:00**

**THANK YOU**

Mr Bulelani Mahlangu,  
Executive Director, South African Medical Research Council

**10:00 – 10:30**

**TEA BREAK**

**10:30 – 12:00**

**SESSION 1 SA INITIATIVES**

**Chair:** Ms G Loots

The Use of Telepsychiatry in Forensic Psychiatry - a possible solution?

M Mars

Improving access to eye care in a rural hospital in South Africa: a teleophthalmology pilot project

S Surka

A TeleCare™ / Telehealth™ Model of Care for the Aged: South Africa

A de Beer

Teleradiology: Challenges of a basic telemedicine application in South Africa's five provinces

J Nkgapele

**PANEL DISCUSSION**

**12:00 – 13:00**

**LUNCH**

**13:00 – 14:30**

**SESSION 2 GLOBAL INITIATIVES**

**Chair:** Prof R Scott

International initiatives to implement Telemedicine/eHealth in Developing countries

F Lievens

Improving health services through TeleHealth in Gilgit Baltistan

S Khoja

Telecardiology project in Rio Grande do Sul State – Brazil: Result from Phase 1

A Sparenberg

The effects of Health Communication Technology in dissemination of contraceptive use among Nigeria teenagers

K Odor

Promoting e-Health initiatives in rural communities through the utilization of Public Internet Terminals (PIT) system: A case study in two rural communities

A Coleman

Antimicrobial Stewardship Programme through Telemedicine: Preliminary result of a Pilot Project in Remote Brazil

R Santos

**PANEL DISCUSSION**

**14:30 – 15:00**

**TEA BREAK**

**15:00 – 17:00**

**SESSION 3 TECHNOLOGY AND INNOVATION**

**Chair:** Prof S Naidoo

Design and Development of a mobile phone based spirometer

B Garth-Davis

The use of Patient-Specific Spinal Cage Devices for Reduced Subsidence

N de Beer

The Health Informatics Building Block Program: The department of telehealth, UKZN experience Background  
Y Singh  
A Strategic Support Framework for the implementation of Predictive Patient-Admission Algorithms in the South African Healthcare System  
R Daffue  
How Network Based Telemedicine Changes the World  
S Normadin  
The impact of changing technology on telemedicine  
D Nel  
Mapping hospital referral patterns for telemedicine needs  
Assessment in South Africa  
M Treurnicht

## PANEL DISCUSSION

# DAY 3, 15 SEPTEMBER

08:30 – 09:00

### PLENARY TALK

**Chair:** Ms A Maloka

The role of PPP's in Telemedicine  
Dr Moretlo Molefi, Telemedicine Africa

09:00 - 10:20

### SESSION 4 'THE EVIDENCE'

Conceptual framework for a comprehensive eHealth evaluation tool

S Khoja  
eHealth assessment survey amongst members of the South African Department of Health (DoH)  
L van Dyk

A decision support tool for telemedicine project management

A van Zyl  
Formative evaluation of an eHealth Research Network using Utilization Focused Evaluation (UFE) Approach

S Khoja  
Retrospective return on investment analysis of the SIMpill Electronic Treatment Adherence Device Piloted in the Northern Cape Province  
S Broomhead  
eHealth assessment study in Africa  
M Molef

## PANEL DISCUSSION

10:20 – 11:00

### TEA BREAK

11:00 – 12:00

### SESSION 5 SOCIAL CONSIDERATIONS (MEDICAL LEGAL AND MULTILINGUALISM)

**Chair:** Mr J Nkgapele

Is telemedicine really as safe as face-to-face medicine?

S King  
The Act, The Regulator, The Constitution and Telemedicine

C Jack  
Development of Multilingual Personal Healthcare Support System  
I Tofukuji

KHRESMOI: Towards multilingual Health information for doctors and patients

A Hanbury

Evaluating consumer perceptions of AfroAIDSinfo™ portal content

M Kotzé

## PANEL DISCUSSION

**12:00 – 13:00**      **LUNCH**

**13:00 – 14:30**      **SESSION 6 eLEARNING**

**Chair:** Ms L van Dyk

eLearning in Health: A South African experience

M Mars

Strengthening Healthcare and professional education in rural Afghanistan

S Khoja

A Pilot OutreachTelepsychiatry Program in KwaZulu-Natal, South Africa

J Chipps

Telemedicine with Digital Video Transport System (DVTS): A South African Perspective

P Hlombe

Challenges of implementing Telemedicine projects, the Limpopo experience

S Nysschens

**14:30 – 15:00**      **TEA BREAK**

**15:00 – 16:30**      **SESSION 7 TELE-NURSING**

**Chair:** Dr S Surka

The status of International Telenursing: A Global Update

L Schlachta-Fairchild

Webconferencing in emergency services: A tool for the training of nursing teams

S da Costa

mHealth: Current practice in the use of cell phones and phones by doctors, nurses and patients in KZN

C Jack

Testing the feasibility of using video conferencing to teach clinical nursing skills

F Walters

Barriers and Facilitators of ICT utilization in nursing education: A systematic Review

O Khondowe

Diagnosis in the first point of care – faster access to treatment saves lives and costs

T Hakkarainen

## PANEL DISCUSSION

**16:30**                      **CLOSE OF CONFERENCE**



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# Retrospective Return On Investment Analysis Of The SIMpill Electronic Treatment Adherence Device Piloted In The Northern Cape Province

<sup>1</sup>S BROOMHEAD, M MARS

*<sup>1</sup>Tintree International eHealth*

Tuberculosis (TB) is a growing problem in South Africa. Directly observed treatment short-course (DOTS) regimen is the cornerstone of controlling TB. One of the aims of DOTS is to ensure patient medication compliance. Nevertheless, approximately 10 - 15% of patients in South Africa default on treatment and treatment success rates remain low. Emerging best-practice suggests that a combined approach, integrating human 'face-to-face' support with technology that improves communication may provide advantages.

## OBJECTIVES

The purpose of the study is two-fold: firstly, to determine the cost effectiveness of utilising the SIMpill electronic treatment adherence solution as an adjunct to directly observed treatment short-course (DOTS) in the Northern Cape Province; secondly, to comment on the appropriateness of the cost effectiveness methodology for use by public health planners in low resource settings.

## MATERIALS AND METHODS

Return on investment analysis is chosen as the method for this cost effectiveness assessment. The analysis utilises the Cost, Effects and Benefits components of the Cost-Effects-Utility-Benefits model of Drummond et al. as well as discounted break even analysis and Net Present Value.

Data are derived from a 2005 pilot of the SIMpill solution and a frequency matched control group. All participants are new smear positive Tuberculosis patients attending Betty Gaetsewe clinic in the Northern Cape Province.

## RESULTS

Comparison is made between the DOTS-SIMpill cohort and DOTS-only controls. For a hypothetical implementation of 1,000 devices, over 5-years, positive return on investment is demonstrated for the DOTS-SIMpill cohort. This is based on improved health outcomes and reduced average cost per patient. Discounted Net Present Value is R3,2 million for a cohort that would have started mid 2005 and R4,7 million starting mid 2010. The net stream is shown to be positive from the first year for both scenarios.

## CONCLUSION

The SIMpill electronic treatment adherence device is shown to be a cost effective means of supporting TB treatment adherence. The abbreviated Costs-Effects-Benefits assessment is proposed as an appropriate tool for use by public health planners in low resource settings to evaluate the return on investment of treatment adherence technology post pilot and prior to implementation.

# A Pilot Outreach Telepsychiatry Program in KwaZulu-Natal, South Africa

**<sup>1</sup>J CHIPPS, S RAMLALL, M MARS**

*<sup>1</sup>University of KwaZulu-Natal*

The pillar of the South African Mental Health Care Act (the Act) No. 17 of 2002 is the designation of general hospitals to admit, observe and treat involuntary mental health care users for a maximum of 72 hours. Most of these hospitals had never previously admitted or cared for psychiatrically ill patients and have limited capacity to administer the Act or provide adequate mental health care. This is compounded by the shortage of psychiatric staff in KZN as in the country. There is a national shortage of psychiatrists with just over 1 000 psychiatrists servicing approximately 40 million people (South African Society of Psychiatrist, 2009). To address this issue, a pilot telepsychiatry was designed and implemented in KZN. Aim: The aim of the study was to implement and evaluate an educational and clinical telepsychiatry project with two rural hospitals in KZN. Methodology: a) Six educational DVDs were developed on the Mental Health Care Act. These DVDs were distributed to the two rural hospitals with pre and post content evaluation questionnaires. b) Guidelines were developed with operational procedures and standard forms. Two outreach clinical services were piloted between a major psychiatric hospital and a rural district hospital and a regional hospital and a rural district hospital. Logs of the implementation issues were kept. Findings: Overall the implantation was successful with educational sessions and clinical sessions conducted and evaluated. The detailed results of the pilot will be reported at the conference.

# Promoting e-health initiatives in rural communities through the utilization of the Public Internet Terminal (PIT) system: A case study in two rural communities

<sup>1</sup>A COLEMAN

<sup>1</sup>TUT

## BACKGROUND

The South Africa government, through the Department of Communication (DoC), in partnership with the South Africa Post Office (SAPO), has established Public Internet Terminals (PIT) in many post offices as part of the DoC's national projects. The fundamental objective of the PIT is to create a communication infrastructure through which the public will have access to government information and services. The problem is that despite the infrastructural investment of 700 PIT workstations that have been set up in the various rural post offices like Taung and Ganyesa, people in these rural areas do not use the PIT services to access government information or health information which an internet service can provide to people. This paper investigates the potential of the PIT system to promote basic health education among the people in Taung and Ganyesa, which are two rural communities in the North West Province of South Africa. The research question is: How can the usage of the PIT system promote basic health education in the rural communities of Taung and Ganyesa?

## METHODS

In this research study a qualitative research strategy using a case study approach was used. The participants were purposively selected from a population group of teachers, nurses, business people and students in the two communities (Taung and Ganyesa). These communities were selected as the research base because the population demographics relevant to this research (i.e. teachers, nurses, business people and students) can be found in all the communities where the 700 PIT workstations have been installed. Observation, group interviews and questionnaire were used to gather evidence from the participants. Participants were asked to perform a task on the PIT system to determine the operational difficulties they experienced, the group interview solicited answers on the social/economic difficulties of using the PIT for basic health education, while the questionnaire elicited the participants' perception about the usefulness of the PIT system in their communities.

## RESULTS

The analysis of the findings revealed that a high number of participants could not operate the PIT system nor able to use the PIT search for relevant health information. Participants cited reasons of overload of information on the PIT interface, use of language (not the mother tongue), and the slow response of the PIT system. The group interview also revealed that many participants lack awareness of the PIT services in these post offices. The few participants who acknowledged the presence of PIT system in the post offices indicated that the PIT system lacks local content specific information such as healthcare information on vaccination, personal hygiene, nutrition and pharmacies around their vicinities. Participants also indicated through the questionnaire responses that the PIT system could be of great benefit to their communities if the services were extended to include basic health education in their mother tongue, "Setswana".

## CONCLUSION

The results from this study led to the recommendations and the development of a model which emphasize that the existing services on the PIT system be extended to include a community basic health education portal on the PIT system. Some of the recommendations are to create the awareness of the PIT system through the local chiefs and community radios stations, train community members in the usage of the PIT and to promote local ownership of the PIT. These recommendations and the model are to promote basic health education in these rural communities. Although this study had a limited number of participants, the findings were unexpected, and therefore of interest to those who intend to implement online basic health education initiatives in rural communities.



# Webconferencing in emergency services: a tool for the training of nursing teams

**S DA COSTA, P DE OLIVEIRA DIAS, J VIANA, S GOLDMEIER**

*Centro de Telessaúde, Instituto de Cardiologia do Rio Grande do Sul, Brasil*

*e-Health Centre, Institute of Cardiology of Rio Grande do Sul, Brazil*

## **INTRODUCTION**

Distance training is a teaching and learning methodology that shortens distances, favours health practices and allows professionals to acquire knowledge, about certain issues, maintaining an ongoing teaching/learning process 1,2. The Digital RS Tele-ECG project is an electrocardiographic telediagnostic network, which combines a video consulting system that links health institutions. Through multipoint webconferencing sessions, there is an exchange of experience and qualification of the remote professionals. Physicians and nurses of the e-Health Centre of the ICFUC-RS, minister the multi-professional sessions in an interactive manner. With the progress of the project, it has become necessary to establish a specific orientation program for the nursing team, with the aim of keeping them involved, engaged, qualified and up to date, within the context and the innovations of the project.

## **METHODOLOGY**

The point-to-point webconferencing sessions are held individually with the nurses of the remote places, broaching difficulties and obstacles experienced by the remote unit, human and material resources, adjusting and adapting of the necessary equipment for the development of e-Health, as well as, revising any doubts regarding the registration and forwarding of tests, web conferences and tele-consultations.

## **RESULTS**

Sixteen 45-minute sessions were carried out with the presence of the remote nurse and 55% of the local IT technicians. Sixty-six percent of the institutions possess resuscitation resources and 83% have a defibrillator. The teams are made up by  $2 \pm 1$  nurses,  $12 \pm 9$  auxiliary nurses and  $5 \pm 4$  physicians per remote unit. Difficulties reported: lack of technical abilities in handling the equipment and Internet network maintenance.

## **CONCLUSION**

Knowing the structural reality of remote health facilities, it is possible to adjust and develop multi-point web conference subjects, collaborating in the qualification and service provided to the patients. The teams feel welcome, increase their adherence to the web conferencing sessions, as well as increasing the exchange of experience and interaction with all the members of the e-Health team – a fundamental aspect for the sustainability of the project. Everyone involved, without exception, considers it important and gratifying to keep in direct touch in case of doubt and receive support without the need of leaving their workplace.

# A Strategic Support Framework for the implementation of Predictive Patient-Admission Algorithms in the South African Healthcare System

<sup>1</sup>R DAFFUE

<sup>1</sup>Stellenbosch University

The concept for this thesis was inspired by a competition called The Heritage Health Prize (<http://www.heritagehealthprize.com>). The \$3-million prize challenges individuals or groups to develop a Predictive Patient Admission Algorithm (PPAA) for implementation in Healthcare Systems across the United States of America. A PPAA accurately predicts whether a patient, from a given patient population, will be admitted to hospital in the coming year and estimates the duration of admission, given the patient's medical history.

The key objective of a PPAA is to decrease the number of preventable hospitalizations, which, for example, resulted in healthcare expenditures of over \$30-billion in the United States in 2010. In addition, a PPAA can be beneficial for (1) healthcare providers (HCPs); whom are now enabled to schedule resources more effectively, becoming more profitable organizations and (2) society in general; where HCPs are enabled to intercede with patients early on, providing the required medical attention as a preventive measure, resulting in healthier societies.

However, the implementation and operation of PPAA's in South African healthcare systems poses various infrastructural and managerial challenges and are mainly inhibited by barriers such as the lack of quality Information & Communication Technology (ICT) infrastructure and inadequate management support. Therefore, proper strategic support, with regards to implementation and use of ICT, Electronic Health Records and Health Information Systems is critical in the management and implementation of PPAA's.

Hence, the thesis will explore the feasibility of PPAA's, by executing a post-implementation impact study of the algorithm on the South Africa Healthcare System, defining the benefits of- and barriers to- the successful implementation and operation of PPAA's in general. The feasibility study will constitute results generated from interviews and data analysis, therefore the study constitutes qualitative and quantitative results that form part of the integrated empirical and non-empirical research project as a whole.

Ultimately, the goal of the project is to develop a generic Strategic Support Framework (SSF) for the implementation of PPAA's in healthcare. The SSF intends to aid HCPs to seamlessly implement PPAA's and consequently enable these organizations to operate the PPAA at the highest level of effectiveness. Therefore, the SSF will also include the specification of the definite requirements for the successful operation of PPAA's in South African Healthcare Systems.

The scope of the thesis is defined by the management structures affected by- and acquired for- the implementation and operation of PPAA's. No priority is given to development of the mathematical model itself, although the requirements and results of the PPAA's will be ascertained for the purpose of constructing the SSF.

# The use of Patient-Specific Spinal Cage Devices for Reduced Subsidence

**N DE BEER**

*Stellenbosch University*

## **INTRODUCTION**

Research literature has shown that there is evidence to suggest that the size and shape of spinal cage implants are critical components for success during spinal fusion (arthrodesis). Failure to achieve adequate support as a result of cage device undersizing could lead to implant subsidence and/or vertebral fracture.

Subsidence depends, in part, on the stiffness and strength of the implant-end plate interface, and factors that influence this interface include bone mineral density, amount of cartilaginous end plate removal during surgery, anteroposterior position of the implant on the vertebral end plate (i.e., variable regional bone strength), implant shape, and implant size.

Manufacturers of cage devices compensate for dissimilarities in patient anatomy by creating different standard size implants, after which surgeons try to select the most suitable match during surgery that will restore vertebral spacing.

Rapid Manufacturing (RM) - a layer manufacturing method, by which final end-use parts can be produced directly from 3D digital data, may be able to offer an alternative solution by its ability to create patient-specific cage implants. It's ability to produce high quality parts in biocompatible materials such as PEEK, titanium and cobalt-chrome enables it to be well suited for the task. Successful results from a recent in-house PhD study, have proven (for the case of intervertebral disc implants) that the stiffness between implant and bone endplate interfaces were significantly improved when comparing flat implants to those with bone-matching contact surfaces. Thereby reducing the risk of implant subsidence.

### **Research Problem**

The aim of this research project will be to investigate whether the results obtained for the case of intervertebral disc implants also apply in the case of patient-specific cage implants - i.e. An investigation to prove that custom-made cage implants reduce the risk of implant subsidence.

## **RESEARCH METHODOLOGY**

Destructive pressure tests will be performed on cadaveric lumbar and cervical vertebra specimens, using standard cage implants compared with patient-specific designed cage implants. Key performance measures will be stiffness as well as displacement, being an indicator to subsidence.

## **CONCLUSIONS**

Results are still forthcoming as this research project is still underway.

# A TeleCare™ / Telehealth™ Model of Care for the Aged: South Africa

<sup>1</sup>A DE BEER, <sup>2</sup>L ROSSOUW

<sup>1</sup>Telecare Solutions (Pty) Ltd, <sup>2</sup>e-Health Services Foundation

TeleCare™ is generally defined as a service enabling individuals, especially the aged (geriatric / risk-exposed individuals), to live independently within their own personal support structures in order to reduce medical / social care costs that are unique to such special / risk groups (e.g., the aged). Globally, especially in westernized communities where ageing societies grow both in numbers and life expectancy, finding alternative care models are imperative. In South Africa, a PPP model (public-private partnership) between the Department of Social Development, Western Cape provincial government and Telecare™ is now in its second year of pilot as a demonstration program studies for under-privileged communities who depend on state care. This paper introduces the TeleCare™ PPP model for individuals in South Africa.

For countries that offer robust social security / national health insurance services (e.g., the UK and Sweden), state dependent individuals are fully covered under their benefits for TeleCare™ / Telehealth™ services. The benefit is that in these countries, a single-purchaser model enables economies of scale. On the other hand, state dependant individuals in South Africa, with no current national health insurance service, are able to access TeleCare™ / Telehealth™ services under a subsidized scheme – subsidized by Department of Social Development, Western Cape and TeleCare™. The current eCare model for state dependent senior citizens in the Western Cape is an evolving PPP model supported by a governance framework comprising:

1) Government contract and subsidy, 2) TeleCare™ provision of services based on SLA (service level agreement), 3) Evaluation by independent non-profit organisation (NGO), the eHealth Services Foundation. 4) Partnering groups – Helderberg Stroke Support Group, DementiaSA.

5) All parties agree to regulatory oversight and outcomes measurement assessing i) Cost / economics, ii) Client-satisfaction, and iii) Quality of care. The target population of the PPP project is for urban aged individuals with LSM (Living Standards Measure) levels 1-3 with house with electricity, residing in the Helderberg area of the Western Cape.

Year 1 Results: 1) Over the course of the first 12-month period, 16% of users executed the emergency call services (average for European Community is 5-10%). 2) 50% of emergency calls were stroke related. 3) Average response time for ambulance support was 12 minutes. 4) None of the calls ended in fatalities. 5) Overall, the contracted party providing the TeleCare™ / Telehealth™ services maintained all contracted SLA's.

The project is now in year 2 and impact measurements are continually adapted to South African local conditions such as signal connectivity of the messaging units of the eCare systems – all working towards a South African model for eCare

# Design and Development of a mobile phone based spirometer

<sup>1</sup>B GARTH-DAVIS, D HOLTZHAUSEN, C WÜRTZ, S LOBACH, T BUNN, M  
BLANCKENBERG

<sup>1</sup>Stellenbosch University

## BACKGROUND

Home telemonitoring features among the various solutions for problems associated with chronic illnesses such as asthma and chronic obstructive pulmonary disease. According to a Danish study asthma was significantly better controlled when physicians and patients used an interactive tool to monitor asthma. This requires a peak flow meter that gives the physician remote access to the peak flow measurements.

A recent study in the rural areas of the Western Cape revealed that 68.5% of asthma patients were not well controlled and in 20% of cases primary health care practitioners did not make a clear distinction between asthma and chronic obstructive pulmonary disease. A spirometer that can generate the maximum expiratory flow-volume (MEFV) curve facilitates differential diagnoses of asthma and chronic obstructive pulmonary disease while remote access will allow physicians to assist nurses in primary health clinics to diagnose these conditions.

## OBJECTIVE

The primary aim is the development of a spirometric device with remote access that can diagnose and monitor respiratory health through MEFV curve analysis in both the home and clinic settings. The design and development of a prototype mobile phone spirometer is presented.

## METHOD

The unprecedented expansion of the mobile phone network in Africa and the modern mobile phone's computational ability makes this the ideal platform on which to base the envisaged spirometer. To reduce costs, a mobile phone using the license free Android operating system is used. An off-the-shelf disposable flow turbine is employed. The flow is detected by an optical sensor that utilizes ambient light and therefore requires no additional power source. The signal input is via the mobile phone's external microphone socket. The phone's computational abilities are exploited to do the required signal processing and to display the MEFV curve on the phone's screen. Data is uploaded to a patient management system implemented on the OpenMRS platform. This allows authorized users to access the data for diagnostic or patient management purposes. Results and recommendations can be downloaded to the phone.

## CONCLUSION

Asthma is the eighth leading contributor to the burden of disease in South Africa. The mobile phone based spirometer can play a role in managing this burden in both home and rural clinics (mainly young patients) as well as contributing to improved respiratory care of patients with chronic bronchitis or restrictive lung disease (mainly elderly patients).



# Diagnosis in the first point of care – faster access to treatment saves lives and costs

<sup>1</sup>T HAKKARAINEN , T HARJU

*<sup>1</sup>RemoteA Ltd*

Common medical disorders are often under-diagnosed since admission to the specialist may take weeks or even months in the traditional chain of care. Therefore general practitioners often refer only serious patient cases to the specialised care. This jeopardises patients' quality of life and delays starting treatment.

When diagnosis can be done in the first point of care many of these problems will be avoided. A telemedicine service for rapid and cost-efficient diagnosis in the primary care with the support from consulting specialists over the Internet has been available since 2002. The service for diagnosis of some common medical conditions like sleep apnoea and cardiac arrhythmias has been utilized so far for more than 40,000 patients in more than 150 primary care locations in three European countries.

The ease, speed, flexibility, and cost-effectiveness of the described approach are obvious. Patients benefit from prompt diagnosis: testing can be initiated in patients' daily activities as soon as the general practitioner has ordered a test. The GP gets a consultation report with treatment recommendations from the specialists of the field. Often the patient can be treated in the first point of care. Patients and specialists benefit as they no longer have to travel to meet each other and queues to secondary care shorten as only patients requiring specialist treatment will be referred.

The cost of a telemedicine specialist consultation is only a fraction of the cost of a typical outpatient appointment in a secondary care unit. The overall costs of specialized care can be controlled by using telemedicine in diagnosis and treatment of patients in the primary care. By reducing the number of referrals via screening, they also reduce the burden and resource utilization in hospitals.

The diagnostics service offered has changed the traditional division of work between primary and secondary care in Finland where it was first initiated. This private enterprise initiative has contributed to public health by improving access to diagnosis, shortening queues to secondary care and reducing costs. Taking into account the unique features of each national health care system similar service can be applied globally.

## **OBJECTIVES:**

- Explain how specialist consultation is organised and what kind of technology it uses
- Describe what benefits are delivered to stakeholders: patients, health care providers, specialists, funders
- Analyse how this novel approach has affected clinicians' work
- Discuss how service can be implemented in different healthcare provider organisations.

# KHRESMOI: Towards multilingual Health Information for Doctors and Patients

<sup>1</sup>A HANBURY, H MÜLLER

<sup>1</sup>TU Wien

Abstract Health information is accessed on the Internet by people with a wide range of backgrounds, ranging from members of the general public to medical professionals (physicians, clinicians, etc.). Members of the general public face challenges ranging from finding information that is trustworthy, in a language that is convenient to read, and at a suitable level of readability, to facing problems to do with basic Internet skills. For physicians and clinicians, the challenge is finding information that is accurate and up-to-date as rapidly as possible, also often with a preference that the information is in the searchers' native language. Radiologists have the special requirement to be able to search through radiological images based on the similarity of certain parts of the images.

KHRESMOI is a large EU-funded four year project (<http://khresmoi.eu>) with 12 partners that aims to satisfy the above requirements by building a multilingual search and access system for health information and documents. This will be achieved by: effective automated information extraction from biomedical documents, including automated estimation of the level of trust and target user expertise; linking information extracted from unstructured or semi-structured biomedical texts to structured information in knowledge bases; support for cross-language search, including multilingual queries, and returning machine-translated pertinent excerpts; adaptive user interfaces to assist in formulating queries and display search results via ergonomic and interactive visualizations; and automated analysis and indexing for medical images in 2D (X-Rays), 3D (MRI, CT), and 4D (MRI with a time component).

KHRESMOI also aims to develop mobile access to medical information. This is frequently requested by clinicians who often work away from their offices and who might have to deal with cases happening in varied situations. Such mobile access is also of interest to clinicians who work in rural areas or in areas with poor infrastructure.

KHRESMOI is currently in its first year, in the phase of gathering user requirements from the general public, medical professionals and radiologists. It is also creating first prototypes that should demonstrate the potential of the technologies brought in by the project partners to meet the challenges listed above. Finally, there is interest in identifying where the technologies developed in KHRESMOI can be applied to challenges outside of Europe.

# Telemedicine with Digital Video Transport System (DVTS): A South African Perspective

**P HLOMBE, M MARS**

*University of Kwazulu Natal*

## **INTRODUCTION**

Exceptional advances in communication and information technologies have brought about dramatic changes in our daily lives. Associated with this technological development, telemedicine has been gaining in use and popularity. A novel telemedicine system comprising of a digital video transport system (DVTS) and internet communication technology facilitated by the increased bandwidth through the South African National Research Network (SANReN) has been established. This system aims to solve problems associated with poor bandwidth infrastructure. The purpose of this study was to conduct a real-time connection between UKZN and Kyushu University Hospital in Japan using the DVTS software for High Definition Video of Endoscopic procedures.

## **METHODOLOGY**

DVTS open source software developed in Japan was used to send and receive high quality uncompressed images between Durban and Japan at 30Mb.

## **RESULT**

The first link was successful with only a few minor problems such as sound because we had to use DV camcorder output to connect to a laptop. Unfortunately the subsequent links were not successful due to lack of communication between departments. The 30Mb bandwidth was acquired from the ICT department.

## **DISCUSSION**

It was identified that for this application to work effectively, close liaison and buy in from the local ICT Department is required as the application demands a substantial amount of bandwidth and the quality of service (QoS). Despite the few minor problems of communication, it was concluded that this application will solve a lot of challenges the specialist doctors have in terms of information sharing of high definition video at a very low cost with their counterparts in the other parts of the World.

## **RECOMMENDATION**

With the availability of bandwidth through SANReN (South African National Research Network) we should strive to utilize this available bandwidth for shared teaching and research with restraint accountability, not only to achieve positive research outcomes but also to help in minimizing the challenges of the shortages of doctors and of specialized skills in rural hospital where they is need for specialized skills.

# The Act, The Regulator, The Constitution and Telemedicine

**C JACK, M MARS**

*University of Kwazulu Natal*

**Abstract** It is widely accepted that telemedicine requires an enabling legislative and regulatory environment if it is to flourish. Advances in technology and associated changes in clinical practice raise the potential for conflict between those responsible for protecting the people and clinicians striving to use information and communication technologies to facilitate healthcare provision. The recent reports of allegedly unethical telemedicine practice by doctors providing services by telephone and text messages have highlighted several issues which until now have remained dormant.

South Africa has arguably the most progressive constitution in the world. The government has committed itself to progressive realisation of fundamental rights such as the right to healthcare, autonomy, equity and dignity. The right to healthcare and autonomy implies that a citizen can choose where and from whom he or she will obtain healthcare. Equality in healthcare implies that the level of healthcare and services offered should not be dependent on geographic location or socio-economic status. Telemedicine has long been seen as a way of improving access to and equality in healthcare. It has been argued that failure to use telemedicine to provide access to specialist services is unethical.

Legislators and regulators strive to protect the people and maintain suitable levels of clinical and ethical practice. There has been a tendency to view telemedicine as something new therefore requiring close and more stringent regulation. While well intentioned this can be viewed as paternalistic and contradictory to rights of autonomy and access to healthcare.

The National Department of Health has stated its desire for telemedicine to be used to improve access and the quality of healthcare. Many of South Africa's clinics are run by professional nurses in the absence of doctors. The Health Professions Act 56 of 1974, section 23(5), requires a practitioner to have, "...ascertained the diagnosis of the patient through a personal examination of the patient concerned through a personal examination of the patient or by virtue of a report by another practitioner under whose treatment the patient is or has been...". This precludes the use of store and forward telemedicine and in many instance synchronous telemedicine between nurses as referrers and doctors. Rule 18(2) of 2004 amendment to the Health Professions Act on the issue of covering, allows a practitioner to "...help or support a person registered under the Act,...the Nursing Act, 1979 ....).

Clarity is required and review of existing legislation and possible amendment to facilitate telemedicine is needed.

# mHealth: Current Practice in the Use of Cell Phones and Phones By Doctors, Nurses and Patients in KwaZulu-Natal

**C JACK, M MARS**

*University of Kwazulu Natal*

## **INTRODUCTION**

Cellular phone use has the potential to facilitate Telemedicine in Africa. The use and financing of cellular phones has potential legal and ethical issues that have not yet been explored in the African setting.

## **METHODS**

Two questionnaires were developed. The first questionnaire was administered to patients in urban areas who were waiting to see private practitioners and to patients in rural areas who were attending outpatient clinics at public hospitals. The second questionnaire was self administered to doctors and nurses working in either the private (fee for service) sector or the public sector where all staff are salaried. Convenience sampling was used. The study was undertaken with the approval of the Biomedical Research Ethics Committee of the University of KwaZulu-Natal and consent was obtained from all participants.

## **RESULTS**

240 patients have completed the first questionnaire. Urban dwellers accounted for 54.6% of respondents, 26.4% live in rural areas and 20% work in urban areas but live in rural areas. 15% of rural users share SIM cards. While 18% of both groups place their SIM cards in other phones. 45% of rural and 11% urban dwellers state that the hospitals use their number to contact other patients, 50% of both groups have been without airtime for more than one week. In the rural areas 4 of the 46 patients who use SMS indicated that they would not like to receive health information by SMS while 9 of the 14 who do not use SMS wanted this service. Of 116 urban patients, 20 SMS users did not want this service while all the non SMS users wanted it. Likewise 3 of the 39 people who are both urban and rural who use SMS did not want the service while all the non SMS users wanted it. Connectivity was not an issue.

400 Health care practitioners, 193 Medical Doctors and 207 Professional Nurses completed the questionnaire. 86% of Doctors and 14% of Nurses use a phone in their daily practice to give or obtain medical advice. 94% of Doctors use their phone when seeking a second opinion from colleagues. 45% of Doctors and 29% of Nurses receive SMS's from patient.

## **CONCLUSIONS**

Mobile health (mHealth) and more particularly cellular telephony is seen as a potential facilitator of telemedicine and eHealth in sub-Saharan Africa. Healthcare regulators need to consider mHealth when developing regulations to ensure they are adequate and enabling.

# Improving Health Services through TeleHealth in Gilgit Baltistan

<sup>1</sup>S KHOJA, A MUQEET, H DURRANI, N MOBEEN, S GULZAR

*<sup>1</sup>Aga Khan University*

Gilgit Baltistan region in northern parts of Pakistan faces greatest barriers due to distance and geographical conditions, resulting in limited access to specialized and quality health services. Use of mobile technologies, such as GPRS and Edge, can provide reliable last-mile connectivity in remote mountainous areas where fiber-optic connectivity is not widely available, and satellite connectivity is either expensive or blocked due to border restrictions. To overcome these problems telehealth solutions were introduced to support diagnosis, enhance capacity and manage information in Gilgit Baltistan.

## OBJECTIVE

The main objective of the study was to develop a Telehealth link between different levels of health centers for patient management, triage and referral of patients; to test the feasibility of this solution; and evaluate the experience of health providers, patients and other stake-holders with eHealth.

## METHODOLOGY

This study involved a mixed method design involving both quantitative (case/control) and qualitative (focus groups discussion and interviews) techniques. The study was a facility-based intervention, where the case sites were provided eHealth solution, (i.e. laptop computers, accessories and available connectivity) and training, while the control sites were not given any such facility. The project utilized two softwares iPath for store and forward and OOVVOO for live consultation. The store and forward consultations were conducted through mobile connectivity (GPRS/EDGE) for most peripheral health facilities; whereas higher bandwidth, i.e. DSL was used to connect secondary care center with tertiary centers, conducting live consultation.

## RESULTS

In nearly eighteen months of duration 302 cases were reported on iPATH. The male/female ration was 1:3, seeking advice on 45 different types of ailments. Nearly 70% of these cases were reported within 24hrs, while 100% of the cases were reported within 72 hours. Study also showed that nearly 68% of patient avoided traveling through this system, 70% of these saved 4 days of travel. The cost saving of per patient was calculated at approximately Rs1000-Rs5000 (USD 10- USD 55) and average teleconsultation cost was calculated at 2 USD. Aside from the store and forward, 25 live consultations were carried out between secondary care center in the areas of psychiatry, surgery, pediatrics and maternal care.

## CONCLUSION

The pilot study has not only proved that using low cost technologies can provide access to specialized care to the community but also has helped built the capacity of healthcare providers at the remote sites.

# Conceptual Framework for a Comprehensive eHealth Evaluation Tool

<sup>1</sup>S KHOJA, H DURRANI, R SCOTT, A SAJWANI

<sup>1</sup>Aga Khan University

As eHealth spreads globally, and various technical problems are effectively addressed and mitigated; the question of evaluating impact of eHealth solutions and whether to invest in eHealth or not becomes more important. The study presents the eHealth Evaluation Framework and tools that were developed after studying several evaluation theories.

## OBJECTIVE

The objective of the study is to develop an eHealth evaluation tool based on a conceptual framework that includes the relevant theories for evaluation of eHealth programs.

## METHODOLOGY

A literature review of peer-reviewed papers from Medline search was conducted, which revealed over 500 abstracts. Full text articles for the 60 papers retrieved and reviewed by two researchers. In addition twenty white papers and documents on eHealth evaluation, evaluation theories extracted through Google search were also reviewed. Several frameworks and theories of evaluation health technologies were studied to develop a comprehensive framework for eHealth evaluation, called KDS framework. The framework was validated by researchers from PAN Asian Collaborative for Evidence-based eHealth Adoption and Application (PANACeA). Comprehensive eHealth evaluation tool is now developed based on the KDS tool.

## RESULTS

### Developing the Framework

The study provides a two dimensional conceptual framework. The framework on the horizontal axis divides eHealth program in different stages such as development, implementation, integration, sustained operation. While on the vertical access it identifies different thematic outcomes of eHealth evaluation such as Health Services, Technology, Economic, Readiness and Change, Socio-Cultural, Ethical and Policy. The interconnections of different stages of eHealth services with the themes requires proper understanding which can be done by evaluating these stages and identify the factors which affecting its performance.

## DEVELOPING THE TOOL

The eHealth Evaluation Framework lead to development of eHealth Evaluation Tools. The face validity of the tool was carried out by sharing the tools with different eHealth Researchers around the world. The content validity is in process via use of the tool for the evaluation of PAN Asian Collaboration for Evidence-based eHealth Adoption and Application (PANACeA) projects; after this validity, the tool would be accordingly modified, tested and made available for other eHealth program/project evaluation.

## CONCLUSIONS

The study presents steps for development of eHealth evaluation tools, from identification of themes, development of a framework, and formation of specific tools. eHealth evaluation should be done from the perspective of healthcare providers, clients and management to achieve a broader sense on the benefits of any eHealth service, program or activity.



# Strengthening Healthcare and Professional Education in Rural Afghanistan

<sup>1</sup>S KHOJA, H DURRANI, S NIGAR, S TIRMIZI, A JAN

<sup>1</sup>Aga Khan University

## BACKGROUND

Afghanistan is a developing country with diverse of language and cultures. Despite security issues in Afghanistan, there is a general understanding of the need for improving living standards of the people through socio-economic initiatives. With the development seen in eHealth (use of information and communication technology in healthcare, The Aga Khan University (AKU), Karachi Pakistan, established a Telehealth link with the French Medical Institute for Children (FMIC), Kabul and the Provincial hospital at Province of Bamyan in Northern Afghanistan.

## OBJECTIVE

The main objective of this study was to establish a model for Telehealth and eLearning activities between a secondary health facility at Bamyan (BPH) and a tertiary hospital in Kabul (FMIC); and evaluate its feasibility.

## METHODOLOGY

This study involved a mixed method design involving both qualitative (case study) and quantitative (mainly pre and post intervention) techniques to test the feasibility of eHealth solution, and evaluate the experience of health providers, patients and other stake-holders.

## RESULTS

The telehealth clinics were established using video-conferencing for live consultations in seven specialties, i.e. cardiology, pediatrics, orthopedic, Skin, Obs/Gyn, ENT and pain management, and store and forward consultations in Radiology and Pathology. A total of 114 live consultations were requested from September 2010 to May 2011, out of which 20 (41%) were in Pediatrics; 28 (25%) in Cardiology; and 14 (12%) in Dermatology.. In telepathology consultations, 79 cases were uploaded on iPath, where 68% were responded within 24 hours while remaining were answered within 48 hours. In Radiology 166 cases were reported from FMIC in the last one year. The average cost saved per case by the patient was recorded to be US\$200, which includes both travel and consultation costs. The average time saved for each consultation was more than 5 days.

A total of 20 eLearning sessions have been delivered from FMIC to Bamyan providing, which were attended by 87 participants to get access to continuing medical education.

## CONCLUSION

eHealth has improved access to specialized care and reduced costs for the patients in Bamyan. The model is being replicated in other parts of Afghanistan. A Learning Management System is planned to be implemented to augment the elearning activities both at BPH and FMIC.

## ACKNOWLEDGEMENT

The project is co-funded by International Development Research Centre (IDRC), Canada and ROSHAN Telecommunications, Afghanistan.

# Formative Evaluation of an eHealth Research Network using Utilization Focused Evaluation (UFE) Approach

<sup>1</sup>S KHOJA, A SAJWANI, H DURRANI

<sup>1</sup>Aga Khan University

PAN Asian Collaborative for Evidence-based eHealth Adoption and Application (PANACeA) was established as a Regional eHealth Network for generating evidence for eHealth in Asian context. Partners were identified from 12 developing countries in Asia, who worked together on multi-country eHealth projects and thematic areas to generate evidence for the adoption of technologically, economically and socio-culturally sound eHealth applications. PANACeA was funded by International Development Research Center (IDRC) Canada for a period of four years (2007-2011). This study reports the findings of formative evaluation of the Network.

## OBJECTIVE:

The purpose of PANACeA's formative evaluation is to determine how the Network supported research projects, capacity building and networking among partners; and to generate recommendations for the future.

## METHODOLOGY

Utilization Focused Evaluation (UFE) approach was used for this evaluation. PANACeA's leadership identified the needs and readiness for evaluation, and selected Primary Intended Users (PIUs) of the evaluation. In total, 25 PIUs were involved to identify the intended uses for the evaluation. The process then involved designing of in-depth interview guides to collect information from PIUs regarding the role of PANACeA in facilitating collaboration and teamwork, knowledge management and capacity building.

## FINDINGS

The findings were organized and analyzed using NVivo Qualitative data analysis software. The major findings include:

### **Collaboration and Teamwork:**

Network members found diversity, collaboration and mentorship model as key strengths of the network. They found hierarchy in network's structure, limited modes of communication, and lack of involvement of government sector as weaknesses in communication. Network facilitated communication by ensuring understanding of common goal and common language, providing expenses and technical support, and ensuring equal opportunities and representation for both sexes to participate.

### **Capacity Building:**

Network helped building partners' capacity in research design and eHealth infrastructure, and enhanced their readiness for conducting independent eHealth projects by providing mentorship, courses, workshops and trainings, collective learning, and providing human, material and monetary resources.

### **Knowledge Management:**

Network provided encouragement for dissemination, built members' capacity, and created opportunities for dissemination through participation in conferences and holding policy dialogues.

## CONCLUSION

The basic purpose of using UFE approach in evaluation is the utilization of its finding. In order to ensure that the network achieves this purpose, the evaluation team facilitated PIUs to list the utilization action steps and take personal responsibility to carry out the steps. The PIUs are now carrying out these actions at different levels in order to bring improvements in the network.

# Barriers and Facilitators of ICT utilization in nurse education: A systematic Review

<sup>1</sup>O KHONDOWE, U CHIKTE

*<sup>1</sup>Stellenbosch University*

## **INTRODUCTION/BACKGROUND**

The value of ICT in nurse education has been documented the past three decades. In South Africa, the demand for healthcare workers is high and has led to a growth of mass higher education. Large classes are an endemic feature increasing the demand for the use of alternative methods to traditional teaching and learning. A number of various applications for e-training or e-learning have been developed around the world. Web-based programs has been used as a means to extend a campus to different student populations, transcending traditional barriers of time, geography, and physical space. There is a lack of a coherent national policy framework on ICT in relation to higher education in South Africa but rather reference to educational ICTs in related policies in ad hoc, limited and indirect ways. The South African Nursing Council has no policy or curriculum demands for universities to include ICT in the nursing education curriculum. ICT has a variety of opportunities and threats. Educators and managers are required to understand these opportunities and threats for success in ICT use for teaching and learning.

## **RESEARCH METHODOLOGY**

A systematic review was conducted to review literature on barriers and facilitators of ICT in nurse education. Potentially relevant reviews and articles were searched through the register of the Cochrane Library, Medline, and bibliographies of articles and books. To be included articles had to focus on barriers and facilitators of ICT utilization in nurse education. Information on methods, results and conclusions was extracted using a pretested form and summarized descriptively.

## **RESULTS AND CONCLUSION**

This study identified facilitators of ICT as good learners skills' increased computer ownership, students' positive attitudes and perceptions that ICT is convenient. Barriers to ICT in undergraduate nursing education included lack of skills and experience, non-supportive environments, awareness of ICT importance to clinical practice, poor student attitudes towards ICT, few or poor resources and lack of confidence.

# Is telemedicine really as safe as face-to-face medicine?

**S KING**

*AIM Centre Pty Ltd*

Telemedicine has been controversial, often denigrated, largely misunderstood and much publicized in South Africa in 2011. We know from studies on attitudes that although telemedicine is not at all a new phenomenon, it is often considered so by healthcare professionals. What's more many professionals have some fairly serious concerns about telemedicine. These concerns centre on two themes - one is the legal / ethical domain and the other is the quality / safety domain. A common provider and regulator concern is that telemedicine is inherently more error prone than its counterpart face to face modality and in particular that diagnosing and prescribing remotely, without a face to face examination, should not be considered a best practice for healthcare delivery.

## **HYPOTHESIS**

This study proposes that when a sophisticated definition of the role of the healthcare provider is used, there is no difference in error potential between a telemedical and face to face medical consultation.

## **METHODOLOGY**

The work presented is ongoing and represents an analysis of two hundred randomly selected telemedical cases from a total of nearly 3000 cases on record between July 2009 and June 2011. First, currently accepted definitions of the role of the healthcare provider are mined for the underlying paradigm. Then applying James Reason's work on error to the model for the healthcare provider's role, a framework of error potential for this role is created. The sampled cases are then analyzed retrospectively against the error potential framework.

## **RESULTS**

The results are anticipated to provide insight into how healthcare professionals can err during a telemedicine consultation. This should provide direct and relevant information to regulators and providers and can guide protocols. The results can also be compared to face to face consultations and the expectation is that no qualitative difference between telemedicine and conventional face to face consultations will emerge.

# Evaluating consumer perceptions of AfroAIDSinfo™ portal content

M KOTZÉ, H VAN ZYL, E VAN WYK

*Medical Research Council*

## INTRODUCTION

In 2001 the AfroAIDSinfo™ Project and its Web presence was launched by the Medical Research Council (MRC) with the main goal of sharing reliable knowledge on HIV and AIDS with specific, targeted audiences. The Web portal is managed by the Web and Media Technology Platform (WMTP) and used to actively communicate HIV and AIDS information to health consumers on the World Wide Web as well as within communities.

Despite the fact that the main goal of research at the MRC is improved health, it is not always met<sup>3</sup>. Providing information and assuming that it will automatically translate into behaviour modification and improved health outcomes is not necessarily correct<sup>1</sup>. Knowledge translation is focused on creating access and awareness of research across all sectors (consumers, patients, practitioners, managers, educators and policy makers) to enable informed decisions<sup>2</sup>.

## METHODOLOGY

Based on an eHealth approach, a Consumer Health Informatics Survey attempted to gain deeper insight into the needs of the AfroAIDSinfo™ Web Portal members. Registered members received invitations to complete the eSurvey through a special edition of the eNewsletter, with a hypertext link giving them direct access to the online questionnaire. The questions enabled the collection of both quantitative and qualitative data to evaluate usage of all the eHealth elements, monthly online articles, eNewsletter and weekly current awareness.

## RESULTS

Overall response rate was 12.8% with all consumer groups (General Public, Educators, Health Professionals, Scientists and Policy Makers) represented equally, except Policy Makers. Respondents represented 19 countries across the globe, including the USA, Europe and Asia. However, the majority of respondents were from the African continent (Botswana, Kenya, etc), with South Africa having the largest representation. It was found that members regularly read all the features on the Web portal and found the information reliable enough to reuse in various applications. Qualitative data verified the quantitative results through many positive comments: “I think your Information is very useful especially for organisations working in African countries. It gives “an inside look to the problems which HIV positive people face in Africa”

## CONCLUSION

The level of satisfaction with the content on the AfroAIDSinfo™ Web Portal was found to be very high. Details of our eHealth approach to knowledge translation, challenges and consumer responses on different eHealth elements will be shared at the conference.

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# International Initiatives to Implement Telemedicine/eHealth in Developing Countries

<sup>1,2</sup>F LIEVENS, <sup>4,5</sup>M JORDANOVA

<sup>1</sup>Board Member and Secretary, International Society for Telemedicine & eHealth, Switzerland, <sup>2</sup>Director Med-e-Tel, Belgium, <sup>3</sup>Coordinator Educational Program Med-e-Tel, Bulgaria, <sup>4</sup>Space and Solar-Terrestrial Research Institute, Bulgarian Academy of Sciences, Bulgaria

The objective is to outline the role of international initiatives for the wide implementation of Telemedicine/eHealth in developing (emerging) countries.

The presentation reveals various initiatives (educational, networking, standardization, etc.) of two international bodies – International Society for Telemedicine and eHealth (ISfTeH, <http://www.isfteh.org>) and The International Educational and Networking Forum for eHealth, Telemedicine and Health ICT (Med-e-Tel, [www.medetel.eu](http://www.medetel.eu)). It tries to answer the questions: What does Telemedicine/eHealth offer today to optimize patient care at anytime, anywhere; to educate patients/citizens and medical staff; to leverage the difference in healthcare services between developed and developing countries; to reduce healthcare budgets and to provide high quality health service with limited resources. Practical examples of systems, devices, smart solutions are presented, answering the questions: Show me what? Where? When? How much? Specific national and cultural points of view on how to develop and implement Telemedicine/eHealth solutions for the treatment of patients and wellbeing of citizens will be included.

Attention is also focused on the necessity of networking and planning, and readiness to learn from the others as contemporary achievements in ICT provide the chance to share healthcare knowledge and skills more easily across the globe. With over 10 000 known diseases and more than 1100 clinical tests, there are wide variations of medical and healthcare knowledge within and between countries. These variations result in significant differences in treatment strategies, health outcomes, health seeking behavior, etc. The opportunities to learn from others are unlimited. The way forward is networking and partnership in order to make the benefits of telemedicine/eHealth available to everybody.

No doubt the topics are so vast and so dynamic that complete and satisfactory answers are impossible within the time-frame of a single presentation. The questions are open ended but the authors will provide some online reference sites for further reading as sometimes, it is just as important to know where to go for an answer as it is to have exact the answer yourself. The presentation will also be broken into subtopics as to avoid confusion.

# eHealth assessment study in Africa

**M MOLEFI**

*Telemedicine Africa PTY (LTD)*

There has been a number of continental initiatives aimed at harnessing e-Health programmes in Africa. These initiatives include the Telemedicine Task Force, the Pan African e-Network and many other initiatives with developmental partners who are keen to fund eHealthprogrammes in Africa. The major challenges have been ensuring that these programmes will be sustainable and making sure that they can be harmonized. Most African countries do not have e-Health policies, e-Health strategies and so most require guidelines for implementation. Also almost all African countries have no e-Health budget in their fiscus. However there are over three hundred e-Health pilot projects underway or planned in Africa and most of them are neither scalable nor sustainable. The majority of projects examined for this study are funded by external donor agencies or were started as research projects. They mostly (and especially the latter) cease when the donor funding is exhausted. In contrast there are very few projects funded by the Ministries of Health from inception by African Countries.

The strategic objective of this assessment was to gather important information regarding the status of e-Health initiatives and projects across the African continent. This information will then be used to determine the success of the projects underway and also gather some knowledge on lessons learnt, which will assist in determining future impact and effective implementation of e-Health projects on the continent.

## **SPECIFIC OBJECTIVES**

The specific aims and objectives aimed to assess and identify the following aspects of e-Health;

- Services and scope provided by the main participating institutions
- Technologies, applications or solutions used in providing e-Health
- Geographical coverage by region country, province, or city
- Project results, summaries and evaluation reports, if available
- Future plans of the e-Health projects

A methodology for the assessment was developed using appropriate WHO guidelines and then it was approved by WHO. Questions and themes were developed to collect information on the specific objectives as stated above. Data was collected via desk top/internet search, telephone and interviews.

Results of this e-Health initiative assessment point to the willingness of its participants, their enthusiasm and their wish to embrace ICTs to aid in providing remote healthcare delivery in Africa. However the lack of resources, coordination, infrastructure and financing are major stumbling blocks towards the adoption and implementation this technology.



# The Use of Telepsychiatry in Forensic Psychiatry - a possible solution?

M MARS, S RAMIALL, J CHIPPS

*University of Kwazulu Natal*

## INTRODUCTION

There is a shortage of forensic psychiatrists and dedicated forensic beds in South Africa. This has led to a backlog of people awaiting 30 day observation. Background. The Dept of Health has recommended “A turnaround strategy to reduce the long waiting list and waiting period for forensic psychiatric observations of awaiting trial detainees referred by Courts in terms of section 77, 78 &79 of the Criminal Procedure Act No 51 of 1977. In KZN, a number of strategies have been suggested, including the use of a single psychiatrist and observation undertaken on an outpatient basis or in a prison.

## RESEARCH PROBLEM

Develop a national evidence based model for forensic telepsychiatry. Methodology: A quantitative survey of readiness of relevant hospitals to provide forensic assessments via videoconferencing was conducted. A systematic search of the literature was conducted to identify evidence to support the feasibility and effectiveness of forensic telepsychiatry for forensic assessments.

## RESULTS

Though KZN has only one forensic hospital which has no videoconferencing equipment, it is located 2 km away from a major psychiatric hospital which is well equipped for videoconferencing. In addition, 34 of the 70 hospitals in KZN have videoconference equipment which is currently being used for either education or clinical services. International evidence from the literature review suggest that forensic telepsychiatry is well accepted clinically in the US, UK, Australia and Canada and that no legal challenges have been lodged against the use of videoconferencing for forensic assessments.

## CONCLUSION

A forensic Telepsychiatry Special Interest Group has been formed within the South African Telemedicine Association and work has commenced on setting up a pilot project.”In the current climate of political commitment to telemedicine, it may be an opportune time to implement forensic telepsychiatry assessments.

# eLearning In Health : A South African Experience

**M MARS**

*University of Kwazulu Natal*

**Abstract** Thirty-one sub-Saharan African countries have fewer than 10 doctors per 100,000 people. In many countries, medical schools lack specialists to teach specific disciplines. Tele-education falls within the definition of telehealth and distributed learning is seen as a way of partially overcoming this problem by sharing teaching. However, Internet penetration in Africa is low, 10.9%, bandwidth remains expensive and power is often intermittent. This paper describes several different approaches to eLearning in health used at our institution over the past 10 years.

## **METHOD**

The following techniques have been used; ISDN and IP based videoconferencing (VC); desktop VC at low bandwidth using open source software; desktop VC using 3G for connectivity; Skype with PowerPoint; various combinations of these; saving VC sessions to DVD for mail distribution; and conversion of DVD materials to MP4. A learning management system has been used to co-ordinate some of these activities.

## **RESULTS**

In 2010, 1,430 hours of postgraduate seminars in 35 academic programmes were broadcast by interactive VC, generating in excess of 80,000 CME credits. Simultaneous use of ISDN based VC, desktop VC and Skype has been used to teach several academic modules. DVDs of a Paediatric Surgery seminar programme are distributed monthly to 7 medical schools in Africa and used for postgraduate and undergraduate teaching. A series of 6 lectures on mental health have been made using commercial software and are being used in hospitals in our region responsible for Psychiatric care which do not have a Psychiatrist. Teaching in various disciplines has been extended to 7 African countries.

## **CONCLUSIONS**

eLearning opportunities have been well received by students and practitioners. Using different modalities, and if necessary using them simultaneously, has extended the reach of the programmes. This experience has led to the development of new model for capacity development in Africa which is currently being implemented.

## **RECOMMENDATIONS**

Within the constraints of power, and bandwidth, eLearning in health can be used to distribute teaching in the healthcare sector in South Africa and into the developing world if appropriate solutions are used.

# The impact of changing technology on telemedicine

D NEL

SITA

In its most elementary form, Telemedicine is the combination of technology, distance and medicine. Medicine is making massive advances and technology is advancing at an equally rapid rate. Gordon Moore is accredited with the doubling of the numbers of transistors every 18 months and this determined the pace of processors and memory (storage) for the last 45 years. The area that Moore's Law is not covering is the field of adjacent technology and this is the area that would have the most impact on day-to-day medicine.

## STATEMENT:

The medical profession is not ready for the wave of new technologies that is manufactured by designers, planners and engineers focused on high volume markets. Although the medical equipment is a niche market, the consumer is more in control than the clinician. It is almost impossible to keep up with this quickly changing market. The primary driver is the cost pressure on the manufacturer of the equipment. Not knowing where to focus would imply not only a waste of valuable time and money but also deprive the medical profession of changing medical inflation tide.

The purpose of this research report would be to educate the interested clinician into best practice. The report will identify trends that would have the most impact on the medical profession but also the largest ROI. One practical example is the fact that many individuals have adopted tablets but the question immediately raised on how would this fit into their day-to-day business activities.

The team was tasked to conduct product evaluation as part of Government Transversal Contract for Electronic Audio Visual equipment. In performing the product accreditation certain trends and market changes became evident. Conversations with OEMs were held under a required non-disclosure and product agnostic manner. The method is to document conversations that will have an impact in the next years (short to medium term) in the medical field and portray this in a vendor neutral manner.

The research report will cover the following:

- The effects of HD on the medical environment
- Developments in the H.264 field
- Medical Cameras
- Broadband – Africa and abroad.
- Developments in medical screens
- Dramatic cost increases for all large screens.
- Projectors vs medical projectors
- Green ICT vs a non green health system
- The disappearance of the CPU
- What will the impact of 3D be
- Touch, medical touch and the tablet

# Teleradiology: challenges of a basic telemedicine application in South Africa's five Provinces

**J NKGAPELE**

*Department of Health*

Telemedicine evaluation report of the first phase cannot be conclusive without getting the first-hand account of user experiences of tele-radiology as its basic application. Earlier evaluation approach looked at management perspective which did not touch on practical usage of telemedicine applications like tele-radiology. For this, five provinces (KwaZulu Natal, North West, Limpopo, Eastern Cape and Mpumalanga provinces) were visited.

The aim was to conduct interviews with tele-radiology users and inspect the equipment and connectivity. The main aim was to assess actual practical usage of tele-radiology. The results of the exercise were poised to better support the provinces and enrich the draft a telemedicine strategy. Therefore the information collected on the visits was also to enable both the Department of Health to view tele-radiology from an eye of a user. These experiences as raw as they were, were to strengthen the draft strategy and tell if the Department is going down the right path or not, long before implementation of the Strategy; thus being a business case that needs no motivation.

A questionnaire as a data collection tool was developed and used in the exercise. It was also supplemented by actual face-to-face interviews with the users. The questionnaire basically asked the following questions:

1. Overall experience on the use of telemedicine
2. Impact on Health Service deliver
3. Location of the telemedicine equipment
4. Connectivity
5. Technical Support
6. Skills and training
7. Recommendation
8. Additional information

The findings were peculiar depending on the provincial management of tele-radiology. For example in Limpopo province there was a problem of connectivity while in the Mpumalanga province there was unavailability of telemedicine champion and the equipment was under-utilized, outdated and unmaintained. In North West province there was a serious challenge of billing on tele-radiology services that were out-sourced to a private practice and was also exorbitant. The Eastern Cape Province had a problem of funding even though tele-radiology ran well due to passion and commitment of staff. In KwaZulu-Natal tele-radiology is supported by a telemedicine committee which met on a regular and had the MEC and the HoD behind it. In this province, tele-education was also a strong point. Common challenges were staff turn-over, lack of interest, techno-phobia, lack of training, skepticism among users, over-worked staff and the frequent system failures accompanied by sporadic maintenance and trouble shooting.

# How Network Based Telemedicine Changes the World

## S NORMANDIN

*AMD Global Telemedicine*

The current limitations presented by in-band telemedicine (as they exist today) lend themselves to many opportunities presented by networked based telemedicine solutions.

In-Band telemedicine is limited because it is 100% hardware codec dependent. Because of this, there is a need to have the same model codec on both the sending and receiving end of a telemedicine consult. This also results in the need for a stethoscope to be present at both the sending and receiving sides of a consult.

In-band telemedicine also posed a challenge because it limits the mobility of consulting physicians. They are too often tied to the rooms where a hardware based codec is located.

Network based telemedicine is an alternative way to accomplish clinical telemedicine. Prior to network based telemedicine, all clinical telemedicine was reliant on medical devices being integrated into the videoconferencing codec. Millions of people have been treated using this method but as with any technology it has its downsides. Network based telemedicine can solve many of the 'hang-over' issues presented by in-band telemedicine.

Network based telemedicine allows for the medical devices' separation from the 'in-band' codec based model and creates an ad-hoc, on-demand medical device network of its own. Nurses and doctors consume device data directly from the device via the web browsers on their desktop PC's.

The appeal of network based telemedicine grows more and more as software based video conferencing becomes more and more a viable application for use at both the clinical or consulting side of a telemedicine consult. Network based telemedicine also eliminates the need for stethoscope equipment to be at each endpoint of a telemedicine consult. With network based telemedicine, all the consulting physician needs to hear heart and lung sounds is a device connected to the internet and a pair of headphones.

Network based telemedicine provides the prospect of lower-cost telemedicine and allows for the completely mobility that physicians crave and deserve. Because network based telemedicine is browser based, a telemedicine consult can be accessed on any PC, laptop, tablet or mobile devices that is connected to the internet.

Organizations such as Ascension Health, the Canadian Space Agency, Cisco, Mayo Clinic, UnitedHealth Care, have all adopted network based telemedicine.

# Challenges of implementing Telemedicine projects, the Limpopo experience

**S NYSSCHENS**

*Telemed Africa*

The delivery of healthcare services in South Africa still remains a challenge and as telemedicine holds promise as a tool for improving the delivery of specialty care, especially in underserved regions, the Department of Health in Limpopo committed to bridging the gap between major hospitals with specialists and regional hospitals where the underprivileged communities still have no access to specialists through telemedicine.

## **METHODS**

This presentation highlights the challenges of implementing a telemedicine project that has grown from a pilot effort to a sustainable network. With the support of the Department of Health Limpopo, a comprehensive telemedicine project was launched in 2008 establishing a telemedicine network linking four sites using real-time consultations using a wireless network. Since then, the project has grown to fourteen sites and is still ongoing. The scaling up of this project highlighted the challenges of moving from a pilot to a fully functional network. Our knowledge of working in the field and our involvement in the implementation of a telemedicine project validates findings on what contributes to a successful project.

## **RESULTS**

Our findings suggest that the key challenges and critical success factors to project success are noted to be:

- Government involvement and support
- A phased approach to ensure slow but sustainable growth
- The acceptance of telemedicine by the community and Health Care Professionals
- Increased public awareness
- Proper communication between all stakeholders
- Technology/Infrastructure readiness (network and cabling) and organization readiness (ongoing training)

## **CONCLUSION**

Change management, a detailed project plan, monitoring and evaluation and open communication channels all contribute to the success of a telemedicine project.

This presentation highlights some of the key points to keep in mind and that simply adopting telemedicine for health care does not solve existing health problems but that social, cultural and behavioral factors are also important.

# The effects of health communication technology in dissemination of contraceptive use among Nigeria teenagers

**K O D O R**

*University of Ibadan*

Health information dissemination is an activity that ensures behavior change among most risk population relating to risk practices that promote ill health. This activity is adopted in formal and non-formal settings. Facilities and personnel are employed to provide health information for behavior change, which aims at preparing teenagers to contribute socio-economically to the society they live. However, evidence-based studies in Nigeria involving the use of information and communication technology (ICT) have been limited to the dissemination of arts and dramas with limited attention paid to health information. This study therefore, determined the effect of communication technology in dissemination of contraceptive use among Nigeria teenagers.

A total of 202 participants in four youth-friendly centres in Owerri, Imo State of Nigeria were used. Six null hypotheses were formulated and tested. Four instruments namely: DVD machine, Projector, Displayer Screen and DVD (MP3disc) were used for the study at each of the four centres.

The results revealed there was significant behavior change on teenagers' attitude and behaviour. It also showed there was significant behavior on teenagers' knowledge in contraceptive use. (P05).

Government at all levels should support the establishment of youth-friendly centres equipped with communication technology facilities, in order to improve teenagers' behaviours on contraceptive use especially in the face of risky practices. They should be encouraged to adopt this strategy.



# Antimicrobial Stewardship Program Through Telemedicine: Preliminary Results of a Pilot Project in Remote Brazil

R SANTOS, O CARVALHO, E SILIPRANDI, R TIMM, A SPARENBERG

ICFUC

## INTRODUCTION

Antimicrobial stewardship programs (ASP) have been implemented in favor of a rational use of antimicrobial drugs. The aim of these programs is to provide better outcomes to patients, reduce drug resistance, prevent adverse events and reduce related costs. Specialized teams are needed to compose effective committees to monitor antimicrobial use. In distant villages there is a shortage of qualified professionals, which limits both the implementation and the evaluation of proper ASP.

## OBJECTIVES

The Instituto de Cardiologia do Rio Grande do Sul (IC-FUC RS), through its infectious diseases and e-Health departments jointly developed a pilot project to provide real-time antimicrobial consultation and rapid cultural laboratory results to physicians, through a web based platform.

## METHODS

The project connects the Hospital São José - a 50-bed clinical community hospital in Porto Lucena (5600 inhabitant town located in the northwest region of RS) - to the department of infectious diseases of the IC-FUC RS. For each case, in hospital medical prescriptions of antimicrobial drugs are filled in the web-based platform and the laboratory staff inserts, in the system, respective data related to positive culture analysis. An infectious disease specialist assesses the information and a written reply is sent back to the physicians' e-mails and cell-phones via text messages (SMS). Cryptographic system SSL guarantees the confidentiality of projects' data (Secure Sockets Layer), at 128-bit encryption. We describe the results of the first patients included in the teleinfectology platform.

## RESULTS

From May 16th to June 15th, 23 in-hospital antibiotic prescriptions were included in the system. Most patients were men (69%); the median age was 67 years. The most common site of infection was the respiratory tract (56% of the prescriptions), followed by bacteremia (22%). The most prescribed antimicrobial classes were the penicillins (85%), followed by aminoglycosides (35%), cephalosporins (17%), macrolides (9%) and quinolones (9%). Thirty nine percent of prescriptions were considered inappropriate. Most recommendations were related to antimicrobial spectrum (40%), change of antimicrobial route (25%), and dose adjustments (10%). Replying teleinfectology consultation (second opinion) averaged 25 minutes from the time of antimicrobial prescription at the community hospital.

## CONCLUSIONS

Small community hospitals and outpatient care units located in remote areas usually do not have well established ASP. In a global crisis of antimicrobial resistance, the current e-health project aims to evaluate and to provide a teleinfectology strategy towards qualifying medical diagnosis and optimizing antimicrobial therapy in underserved areas in Brazil.

## The status of international telenursing: a global update

L SCHLACHTA-FAIRCHILD, D CASTELLI, L SCOTT, B PYKE, C BARTZ

*ICFUC*

The advancement of international Telenursing began with volunteers who identified a need for nurses globally to learn about the role and development of the nurse in the use of healthcare technologies for providing patient care at a distance. The International Society of Telemedicine and eHealth (ISfTeH) Board of Directors approved a Telenursing Working Group within the ISfTeH in 2007 [http://www.isfteh.org/working\\_groups/category/telenursing](http://www.isfteh.org/working_groups/category/telenursing) . The Board of Directors of the International Council of Nursing (ICN) in Geneva, Switzerland was petitioned to form a Telenursing Network and Advisory Group, which were approved in 2008. The ICN is the premiere international professional nursing organization, representing 135 countries' nursing associations globally. The ICN has created a "Telenursing Network" webpage to inform and educate nurses globally [http://www.icn.ch/telenursing\\_network.htm](http://www.icn.ch/telenursing_network.htm). Advancing Telenursing as a solution for access to healthcare, nursing shortage and improving quality of life of the global citizenship is the goal of our collaborative efforts. Using Elluminate, a remote presentation technology platform, this panel will provide an update of Telenursing in the US, Canada and around the globe from international presenters.

# The Health Informatics Building Blocks Program: The department of telehealth, UKZN experience

**Y SINGH, M MARS**

*University of Kwazulu Natal*

## **BACKGROUND**

The Health Informatics Building Blocks (HIBBs) Program, managed by the Global Health Informatics Partnership seeks to build capacity in resource constrained environments. The HIBBs program aims to create training modules on Medical Informatics that may be used as open educational resources. In December 2010 the Department of Telehealth entered into a HIBBs pilot agreement with the American Medical Informatics Association. This agreement aimed to create reusable and adaptable learning resources that can be used as standalone tools or as part of an existing teaching.

## **AIM**

- The aims of the HIBBs Pilot agreement were as follows:
- Develop four HIBBs modules using the HIBBs design instructions and slide template.
- Implement the HIBBs modules
- Evaluate the effectiveness of the HIBBs modules

## **METHODOLOGY**

The HIBBs modules created using commercial screen recording software, and were administered fifteen times to the various groups both in real time during allocated class periods and asynchronously via a learning management system called Moodle. Quizzes were created on the topics and concepts covered in each of the HIBBs modules. In order to assess the effectiveness of the module, the students were required to take the quiz before any material was given to them. They then either watched the HIBBs module in real time been projected in the class room or in the case of Moodle they watched the HIBBs module in their free time. They then took the quiz for a second time either on printed paper in the class room or in the case of Moodle via a Google document. For some assessment, the quiz was administered for a third time a few weeks later. The 62 students eventually filed out 496 quizzes.

## **RESULTS**

The quizzes were marked and the average mark of each of the groups per HIBBS module was determined. This is shown in table One.

Preliminary results indicate that the HIBBS had a positive affect on the participants. The purpose of this paper is to stimulate discussion on the use of a similar technique for telemedicine.

# Telecardiology Project in Rio Grande do Sul State - Brazil: Results from Phase I

A SPARENBERG, G FETTER, V PORTAL, R KALIL

*ISfTeH*

Heart diseases - mainly coronary artery disease - are the most common cause of death in many countries. Since the year 2008, a public telecardiology project is being implemented by the Instituto de Cardiologia do Rio Grande do Sul (ICFUC-RS), in southern Brazil.

## OBJECTIVES

The establishment of a telecardiology network aiming to: offer immediate Tele-ECG diagnosis for distant and underserved villages; allow medical counselling via videoconferencing facilities (second opinion in cardiology), and; establish a telecardiology training program (presence mode activities and lectures) towards qualifying the participant institutions.

## METHODS

The telecardiology Project was implemented in the emergency rooms of 2 cardiology centres - ICFUC RS and the Hospital de Cardiologia of Rio Grande - and in 11 remote health care institutions. The method includes: acquisition, recording and transmission of urgent digital ECGs and sending respective electrocardiographic diagnosis back. A service for telecardiology second opinion via webconferencing session and a presence mode qualifying program in telecardiology are part of this e-Health strategy.

## RESULTS

The Telecardiology Project (phase I) was implemented in 6 cities in the northwestern and in 5 in the the southeastern regions of RS, between 2008 and 2010. In this 2-year period 466 urgent ECGs were recorded and transmitted for specialized analysis at ICFUC-RS. Patients' median age averaged 57 years, with 221 (47,5%) of female sex. The exams' analysis showed: 25,9% with evidence of acute cardiac diseases, 45,7% with chronic ECG diagnosis, and 13,6% were considered normal exams; 11,8% ECGs without specialized interpretation and in 2,8% the ECG was recorded for a local test of the system. Videoconferencing for second opinion was requested in 101 cases (21,7% of urgent ECGs). A total of 79 patients (16,9%) were transferred for specialized care in referral centres. During a 4 month period, a total of 121 professionals were trained in the participant institutions: 67 (55,4%) in the north-western and 54 (44,6%) in the south-eastern region .

## DISCUSSION

The RS state has ideal conditions for the establishment of telecardiology projects, including a huge territorial area and a shortage of cardiologists. The successful implementation and sustainability of such initiatives demands crossing some important barriers, mainly represented by inappropriate telecommunication infrastructure and cultural and financial challenges. In the current Project, the adopted telecardiology strategy was effective, allowing the immediate diagnosis of acute cardiac diseases in 121 patients (21,9%). The method also avoided unnecessary referrals, as 83% of patients were treated in the regional institution.

# Improving access to eye care in a rural hospital in South Africa: A teleophthalmology pilot project

<sup>1</sup>S SURKA, <sup>1</sup>J FORTUIN, <sup>2</sup>J SURKA, <sup>2</sup>C CAMPOS

<sup>1</sup>Telemedicine and mHealth Division, Medical Research Council, <sup>2</sup>Department of Ophthalmology, WSU and Nelson Mandela Hospital, Mthatha, Eastern Cape

## BACKGROUND

Diabetic retinopathy, an ocular complication of diabetes, is the third leading cause of blindness in South Africa and is responsible for 8% of blindness. Screening for diabetic retinopathy can prevent blindness. An effective method to screen for diabetic retinopathy is with fundus photography. Digital images are sent for further assessment by specialists. The objective of this study was to evaluate the efficacy of screening diabetics for retinopathy in a rural setting using a teleophthalmology service.

## METHODS

A diabetic retinopathy screening service was implemented at Zithulele Hospital in the Eastern Cape. Diabetics were screened using a fundus camera. Digital images were forwarded to ophthalmologists for assessment. Patients requiring further treatment were then referred on

## RESULTS

The pilot ran for eleven months between January and November 2007. 119 diabetic patients presented to hospital. 43(36%) patients were screened. Of these 30, 2% were found to have retinopathy and 7% were found to have severe retinopathy, warranting immediate intervention.

## DISCUSSION

In rural areas of the Eastern Cape many diabetics don't receive an annual eye examination. A teleophthalmology service has the potential to improve the access to eye care. The results highlight both this potential to improve access to eye care in rural areas as well as challenges faced in implementing a teleophthalmology screening service in resource limited facilities.

# Development of Multilingual Personal Healthcare Support System

I TOFUKUJI, Y TAKEUCHI, S MIZUTANI

*Takasaki U of H & W*

In Japan, there are four major laws for public healthcare and health-promotion services corresponding to the people's life stage. However there are no linkage or data exchange among these services, so effective collaborations and practical usage of health history information are desired. In Gunma prefecture foreigners share 2.4% of the population, so that easy access to healthcare services is necessary for them while they are in Japan.

We developed a personal healthcare support system named "Gunma Health Network - My Page" based on the web-technologies. This project was funded by 2010FY budget of Ministry of Internal Affairs and Communications. We developed system architecture in September 2010, and opened the website, "My Page" in January 2011.

We recruited the members to sign up for "My Page", and 303 people including three foreigners made registration (March 2011).

We accepted paper based application and health checkup forms. Based on that form, we coded their disease history and medical examination items manually, and uploaded into the server. "My Page" has a wide variety of functions. For instance, the member can view his/her personal data, his/her own health checkup history data in table style or graph style. It was designed to maintain interoperability in the future by adoption of standard code systems such as the ICD-10 or JLAC-10. "My Page" has questionnaire function of self-health check, which provides in multiple languages; English, Chinese, Portuguese and Spanish. By doing this, people from overseas also have healthcare service in Gunma Prefecture.

We applied manual coding of disease history and medical examination items for the future interoperability and data exchange; however the problem is that it takes labor cost and time, therefore it is urgent task to develop cost-cutting strategy.

We have only 303 members who use "My Page" at the moment. As it stands now, the numbers of users are so few to sustain the operation.

We are planning two solutions to increase the users next year. One is that to promote group registration to regional universities and companies to join "My Page".

Another plan is that we will provide "My Page" in other language, Korean and Russian.

Also introduction of healthcare human services such as health guidance, nutrition guidance, and exercise guidance are very important factors to sustain the system operation.

# Mapping Hospital Referral Patterns for Telemedicine Needs Assessments in South Africa

**M TREURNICHT, L VAN DYK**

*Stellenbosch University*

Abstract Telemedicine could effectively aid hospital referral systems in bringing specialized care to rural communities. South Africa has identified telemedicine as part of its primary health care strategic plan, but similar to many other developing countries, the successful implementation of telemedicine programs is a daunting challenge. One of the contributing factors is the insufficient evidence that telemedicine is a cost-effective alternative. Furthermore, many telemedicine services are implemented without a thorough needs assessment.

This paper investigates the use of medical informatics in quantitative telemedicine needs assessments. The mapping of referral patterns between hospitals could assist to better understand the extent to which telemedicine could aid hospital referral systems. Hospital discharge reports from electronic patient records contain data regarding patient referrals. Through the intelligent analysis of this data, different characteristics of referral systems can be mapped. These characteristics include referral diagnoses, transport requirements and general referral statistics.

The main purpose of hospital discharge reports is to support hospital financial processes. Unfortunately, these reports do not include indications of the possibility that referrals could be done with telemedicine. A relationship between the diagnosis recorded and telemedicine referrals should therefore be established. This is done by statistically analysing the probability that an International Classification of Diseases (ICD-9) code for diagnoses can be associated with an ICD-9 procedure code. A matrix of probabilities is calculated for all diagnoses and procedures for ICD-9-CM. A dataset, made available by the United States government is used for the calculation of this matrix.

The primary health care model defines different level-of-care hospitals in South Africa by the different procedures they are able to deliver. Telemedicine in South Africa are also limited and would not be able to substitute all referrals by performing all possible procedures. In this paper the concept of statistical analysis using large data sets to predict telemedicine referral patterns are discussed.

A decision support system is introduced to direct implementation policies for all hospitals within a referral network. The potential benefits of telemedicine, as output of the system, will enable implementation planning to follow a clinical-pull strategy. This research aims to contribute towards reducing the amount of failed telemedicine projects in South Africa, by providing decision support to implement appropriate technologies within a hospital referral network, ultimately contributing towards better quality health care.



# eHealth assessment survey amongst members of the South African Department of Health (DoH)

<sup>1</sup>L VAN DYK, <sup>2</sup>J FORTUIN

<sup>1</sup>Stellenbosch University, <sup>2</sup>South African Medical Research Council

## BACKGROUND

E-health readiness can be defined as the “preparedness of healthcare institutions and communities for anticipated change brought by programs related to Information and Communications Technology (ICT)” (Khoja, 2007). Hence, knowledge about e-health readiness may contribute to an understanding of reasons and remedies for the telemedicine projects in South Africa not reaching maturity.

The purpose of this study is to determine the e-health readiness in South Africa in order to assist in decision making with respect to the road ahead.

## METHOD

An electronic version of Khoja’s e-Health Readiness Assessment Toolset for Healthcare Institutions in Developing Countries was developed is used for purposes of this study. Khoja (2007) originally developed these set of questions with the purpose of assessing e-health readiness for public and private healthcare institutions in developing countries. It comprises out of more than 50 statements combined with a five-point likert, organized in 5 categories, namely core-readiness, technological readiness, policy readiness, learning readiness and societal readiness. Participants and data Representatives (n=31) of provincial departments of health (DoHs) so South Africa completed this online version.

## RESULTS

The following types of deductions were made at from the feedback: Firstly, those aspects concerning eReadiness on which participants do not agree, secondly the degree eReadiness in cases where they do agree and finally correlation between individual statements. To conclude the significance and value of these results are contemplated.

# A Decision Support Tool for Telemedicine Project Management

A VAN ZYL

*Stellenbosch University*

**Abstract** Due to the fact that telemedicine is relatively new field, crossing multiple disciplines, few, if any telemedicine specific frameworks exist to support the project team during the development and implementation phases of the project. This paper describes the development of a prototype decision support system, to support project managers and their teams, during the development and implementation phases of the project.

## **METHODOLOGY**

A database, developed in Microsoft Access, will be created to store data using previously documented telemedicine projects. The goal of collecting the data from previous telemedicine projects is to map certain aspects of multiple projects in a multi- dimensional space to identify correlations between the dimensions of these projects. Multiple questions are answered with regards to each telemedicine project. After sufficient data is collected from the various telemedicine projects, the raw data are exported to Microsoft Excel where it will be converted into an acceptable format to be imported into MATLAB. MATLAB is used because of its superior computational abilities and to plot the data in a three dimensional space. The purpose of plotting the data is to give a visual presentation of the data and to identify clusters with similar attributes. It will also be used to identify any significant aspects regarding the success or failure of the telemedicine project.

Future work will consist of shifting the Microsoft Access database to a Microsoft SQL database. This will allow for a web integrated database which will improve the integrity of the database by being more representative of current telemedicine projects from a wider area. It will also allow for telemedicine projects to be documented as they happen. An internet based input and output platform will be developed to provide quick and relevant support to telemedicine project leaders.

# Testing the feasibility of using video conferencing to teach clinical nursing skills

<sup>1</sup>F WALTERS, J CHIPPS, P BRYSEWICZ

*University of Kwazulu Natal*

## INTRODUCTION

Declining inpatient populations, concerns for patient safety and advances in learning theory are forcing healthcare educators to look for alternatives to the traditional clinical encounter in which students acquire clinical skills. Internationally, simulators in Nursing are used as an adjunct to clinical practice, to teach clinical skills. The need for patient simulation is being driven by the need to recreate important but rare clinical situations that most students would miss if left to random clinical encounters, when specific patient situations are not available.

## BACKGROUND

The School of Nursing (SON) has started broadcasting teaching sessions to rural midwives using videoconferencing (VC). To date these sessions included only theory and not clinical skills. The SON would like to extend the VC teaching to include clinical skills and use VC and simulation models to teach nurses in the outlying areas. The combination of VC and simulation is relatively new and has not yet been tested.

## AIM

The aim of the study is to do a benchmark testing of the feasibility of using VC in clinical teaching in nursing in resource constrained environments.

## METHOD

Tests will be conducted using a part body or partial task trainer simulation model and a live model, two different clinical skills, at different three different bandwidths using ISDN and IP. The tests will be conducted between the School of Nursing and Nelson R Mandela School of Medicine VC venues. Raters will be blind to the item being tested and the quality of the audio and the image in each scenario will be rated using a standard rating scale.

## RESULTS

Results will be reported for each scenario and for each bandwidth. Recommendations will be made for suitability of different clinical skills and different models for VC. From the tests that will be undertaken a suitable bandwidth for VC for this teaching method will be the outcome.

## CONCLUSIONS

The need to be able to reach nurses at the outlying areas and teach clinical skills and scenarios which they would otherwise never see or experience using VC is an ideal method to increase the skills of these nurses and keep them in the work place. Due to the lack of specialised skills for nurses in the outlying areas this method of teaching using tele-simulation would be an ideal method.

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