The ASEAN Rural Connectivity Conference for Education and Development

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Rural Tele-health Practice India
Evolution of Mobile e-Health Technology, Tools and Systems

Prof. S. K. Mishra, MS, FACS
Head, Dept. of Endocrine Surgery &
Faculty I/C, SGPGI Telemedicine Programme
SGPGIMS, Lucknow, India
Agenda

• Introduction to Indian Telemedicine Program
• Global Telemedicine: Indian (MEA) initiatives (Africa, SAARC & ASEAN)
• Rural Tele-health Practice – Case Studies
• Evolution of mHealth Tools and Systems - India models
• Conclusion
Introduction to Indian Telemedicine Program

• Telemedicine Program in India started in 2001
• Mostly Federally funded programs, few state and corporate stakeholders
• National Programs by Ministries of Health, Communication & IT, Space (ISRO)
• India Space Research Organization (ISRO) deployed Satcom based National telemedicine network connecting 350 Rural hospitals with 50 Specialty hospitals
• Global initiatives by External Affairs Ministry in Africa (47 countries), South Asian (03 countries) and ASEAN (CLMV) countries
• Indigenous technology, tools and capacity
Major National Telemedicine Initiatives by Central Government
Initiated some successful pilot projects including Development of Indigenous Telemedicine Software and System

- System for specialty applications
  - OncoNET Kerala—Cancer care for rural masses & development of a Tele-Oncology System
  - Development and Application of Telemedicine for Radiology cases West Bengal
  - Diagnosis & monitoring of Tropical diseases – West Bengal
  - General telemedicine system for all specialties in various states

- Standardization activities in e-health/Telemedicine
- Prepared a framework for IT Infrastructure for Health

Indian Space Research Organization
Since - 2001

- Satellite Communication based Telemedicine Network through Indian Satellite System (INSAT)
- Collaboration with state governments
- Around 400 nodes across the country – 17 Telemedicine Mobile Vans
- Free satellite bandwidth

[Image: ISRO's TELEMEDICINE NETWORK - ESTABLISHED SO FAR]

439 Hospitals — 382 Dist/ Rural Hospitals — 57 Super Specialty Hospitals

[Website: www.isro.org/scripts/telemedicine.aspx]
• Integrated Disease Surveillance Project (IDSP)
• National Cancer Network
• National Tele-ophthalmology Network
• National Digital Medical Library Consortium
• National Rural Telemedicine Project
• National Medical College Network over High Speed fiber back bone of National Knowledge Network
Global Telemedicine Collaboration by Govt. of India
Africa, South Asia & ASEAN (CLMV)
SAARC Telemedicine Network

- Implementing Agency: Telecommunication Consultant India Ltd. (TCIL), Government of India enterprise
- Connectivity: Hybrid (satellite & terrestrial)
- Networking of one hospitals in each of the SAARC countries with two Super Specialty hospitals in India
- Current Status: JDWNRH, Bhutan, Indira Gandhi Child Hospital, Kabul, Afghanistan & Patan Hospital, Kathmandu, Nepal with SGPGIMS, Lucknow & PGIMER, Chandigarh
- Activity: Tele-education and Tele-consultation. Sharing of Workshop, Seminar held in designated Indian Medical Institutions
SAARC TELE-Medicine Network

Network Layout

SATELLITE

1 mbps
512kbps
1 mbps
512kbps

All India Institute
Of Medical Sciences
New Delhi

TM SERVER
DELL PE 2900

BSNL
HUB
Bangalore

Sanjay Gandhi Post
Graduate Institute
of Medical Science
Lucknow

Post Graduate Institute
Of Medical Education
And Research
Chandigarh

SAARC countries

INDIA

ODU

IDU

SWITCH

LAN at Patient
end location

D LINK
DES3010G
Design of Telemedicine workplace
Screen Shot of activities under SAARC Telemedicine Network
PAN Africa eNetwork

- Implementing Agency: TCIL
- 53 countries of the African Union
- Connectivity: Satellite & fiber optic network
- Operational since 2009
- Activities: tele-healthcare & tele-education
- Current status: Operational since 47 African countries joined the project
- 12 Super-specialty Hospitals in India provide service
- Distance Education provided by 07 leading Indian Universities
PAN African eNetwork

PAN African - Tele-Education Network – Overall Architecture

- VSAT Hub at Selected PAN-African Country
- Five African Universities connected to HUB through 2 mbps broadband/VSAT
- 53 VSAT based Remote Virtual Class Rooms in 53 Countries

6 universities from India will be connected through IPLC link to the HUB at Africa.
Inauguration of the Pan African e-Network
26th Feb 2009
Dr. Abdul Kalam, President of India at Care Hospital, Hyderabad
Layout at Super Specialty Hospital in India

Tele-Medicine Software
- PACS Server
- HL7 Complaint HIS
- DICOM 3.0 standard Server
- Tele-Medicine Conference SW

Layout SSH (India)
PAN African e-Network CME Setup (India)
Layout at Remote End

Telemedicine

Patient end and Doctor end at AU Super specialty

Tele-education
Layout at Remote Hospital at AU Countries
Digital Studio Setup for Tele-CME at SGPGI, Lucknow
Tele-Consultation Room and A/V Control Station at SGPGI, Lucknow
Data Center at TCIL, New Delhi
NMS Room Hub station Dakar, Senegal
VSAT Hub station Antenna in Dakar, Senegal
Fann Hospital, Dakar in TM Mode
TE Session in progress in Addis Ababa University Center
ASEAN (CLMV) e-Network

- Under ASEAN-INDIA Bilateral Co-operation program, ASEAN (CLMV) e-Network Project was proposed
- A delegation from CLMV Countries were invited to participate in a workshop in New Delhi held on 25-26, March 2009 to share Indian experience in Telemedicine & Distance Education. Pan-African e-Network operation was demonstrated at TCIL HUB & Data Center
- Subsequently a delegation from India visited CLMV countries from 25th Jul to 7th August 2011 to carry out Telemedicine and Tele-education Need assessment Study.
- The project once operational will facilitate CLMV countries to get connected reputed Indian medical institutions and universities
Rural Tele-health Practice – Case Studies using mobile ehealth platforms
1st Mobile eHealth System

2001

- Prototype of First Mobile eHealth System developed.
- Suitcase and Mobile Van were developed and demonstrated.
- ISDN as Communication Media
Disaster Telemedicine Kit

2002

- Designed and Developed in Year 2002 as P.O.C. used in Gujarat Earthquake
Shankar Nethralaya Tele-Ophthalmology Unit

http://www.sankaranethralaya.org/
Design of Mobile Unit
Mobile Refraction Unit
**Aravind Mobile Eye Screening VAN**

- ISRO Connectivity
- Known Diabetic Pts are collected by Physician
- Recorded in a specialized software “EyeTalk” & transmitted to the reading grading center at Base Hospital

http://www.aravind.org/telemedicine/va.htm
Tele-diabetic Care through mobile unit

- Platform designed for Rural Diabetic Care
- Collaboration between Madras Diabetes Research Foundation (MDRF), World Diabetes Foundation and ISRO.
- Serves 42 villages (in and round Chunmpet village) in Kancheepuram District, Tamilnadu, India.
- The experts testing, diagnosis, medicines and even laser surgery are at doorstep.

www.drmohansdiabetes.com
Internal view of MDRF Mobile Tele-diabetic System

www.drmohansdiabetes.com
Tele-Oncology Unit
Malabar Cancer Care Society, Kannur, Kerala

Comprehensive Disease Control Activities Through Early Detection, Treatment & Awareness Building for Cancer, AIDS, TB, Cardiac diseases & Pre and post natal requirements.

‘Sanjeevani’ is a Mobile Tele Oncology unit with satellite communication link, advanced diagnostic and treatment equipments, telemedicine infrastructure, software for Electronic Health Record, e-Health Card for patients etc. aimed to provide telemedicine services for early cancer detection, follow up consultation, treatment of cervical cancers and awareness building to rural masses at five northern districts of Kerala.
Exterior View
Interior View: Documentation & Videoconference Station, Satellite Indoor unit
Interior view: Laboratory workstation
Interior view: Videoconference Station (close up view during operation)
Interior view: Operation Table for Colposcopy and cauterization for early cervical cancer
Equipment installed inside mobile van

Mobile Ultrasound and X-ray Unit

Colposcopy Unit used for early detection of Cervical Cancer & intervention
Patient Access Door and Satellite External Unit Housing

Patient Access Door

Satellite external Unit housing
Sunayanam- Teleophthalmology System

• Regional Institute of Ophthalmology (RIO), Trivendrum
• Designed and implemented by C-DAC
• Well-equipped to carry out complete ophthalmic examination.
• Further assistance are met with by contacting the specialists at RIO by way of videoconferencing
• Equipped with photo slit lamps.

Mobile eHealth System for community healthcare

- Amrita Institute of Medical Sciences, Cochin (AIMS) Hospital’s Mobile Telemedicine Unit is the size of a city bus and includes X-ray facilities, ECG scanner, pathology-lab-work facility, specialty cardiac services and a telemedicine satellite link with AIMS Hospital.
- First used in tsunami-relief work in Kerala and Tamil Nadu.
- Direct Relief International (a U.S based NGO) has supported in setting up of this van while Indian Space Research Organization (ISRO) provides the satellite-technology and connectivity.
Application of AIMS Telemedicine Van
Tele-health service in Koshi flood affected Area
Tele-consultation from VAN
• Evolution of wireless communication technologies have enabled telemedicine systems to operate in the remotest place for rural health practices hence expanding telemedicine benefits, applications, and services.

• In India majority of the people are living in the rural and remote locations where even the basic facilities are not available for the society.
mHealth4u Suitcase and backpack model
School of Telemedicine & Biomedical Informatics, SGPGIMS
Integrated Medical Equipments

PC Interface:
USB & Bluetooth

Connectivity via High Speed Broadband (HSB)
Screen Shot of Software based Video Conferencing
Screen Shot of Cure-Soft Software
Thank You