Working Solutions for Telehealth in Low Resource Areas

MedInfo 2013 Panel Session

Contributed by
IMIA Working Group on Telehealth
Telehealth Context

- Use information and communications technologies (ICTs) to deliver health services over distance.

- Encompasses a wide range of healthcare processes including diagnosis, treatment, prevention.

- Typically involves care recipient(s), care provider(s) and/or educators.

- About transmitting information (voice, data, images) rather than moving people.
Components of Telehealth Solutions

- **ICT Infrastructure**
  (e.g. capture/display devices, platforms, software, connectivity)

- **Clinical Processes**
  (e.g. “best practice”, workflow, ethics/privacy, decision support)

- **Operational Environment**
  (e.g. funding, access, scale, performance, personnel, education)
eHealth Issues for Low Resource Areas

- **ICT Infrastructure**
  - Poor connectivity at high bandwidth (e.g. wireless)
  - Scarce and dated equipment (e.g. computers)

- **Clinical Processes**
  - Clinical activities concentrated on healthcare priority areas
  - Lack of supporting elements (e.g. bookings, follow-up, experts)

- **Operational Environment**
  - Uneven deployment and management of resources
  - Low level of technical competence (e.g. maintenance, training)
Panel Presenters

- Anthony Maeder, Australia
- Shashi Gogia, India
- Gunnar Hartvigsen, Norway
- Maurice Mars, South Africa
- Sushil Meher, India
Panel Discussion on Issues and Needs

- Major enablers and blockers, effects of sources of support
- Difficulties of scaleup and replication, with limited resources
- Augmentation and integration in clinical activities
- Understanding success factors and leveraging eHealth strategy
- Education/training, support/maintenance, capacity building
Contact Information

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Telemedicine for Low Resource Areas – The SATHI Experience

Dr S B Gogia
President SATHI
S.A.T.H.I

Society for Administration of Telemedicine and Healthcare Informatics

- Non profit organization (Society)
  Registered - No 49774/2004 (Delhi)
- Like minded Medical, IT, Social Sciences as well as Tele Communication Professionals

Twin priorities

Telemedicine can go a long way in providing affordable and quality healthcare to each and every person of our country

- For sustaining its growth, India needs to provide facilities as well as jobs in rural areas

  *We have a hands on approach to projects*
What is Telehealth

- Use information and communications technologies (ICTs) to deliver health services and transmit health information over both long and short distances.

- About transmitting voice, data, images and information rather than moving care recipients, health professionals or educators.

- Encompasses treatment, preventive (educational) and curative aspects of healthcare services for recipients

- Typically involves care recipient(s), care providers or educators
Treatment Processes

Patient with Eye problem (e.g. Simple Dressing)

Local/Village Practitioner

Affordable (₹ 50)

Doctor in nearest town

Upper Classes or those having relatives in major Towns

But the local practitioner needs to know how to do the dressing

Low Cost (₹ 10)

Cost of travel (₹ 500)

Costly Treatment (₹ 200)

Stay and Relatives(??)

Time off Work for all (??)
There is Technology ---

Documents
- Covering Letter
- Scan Note
- Audio
- Electronic Stethoscope
- Snapshot
- EKG Phone

Moving Images
- Video
- Pathological Slides
- Pathological Clip
- CathLab
- Echo Cardiograph

Medical-Conferencing
- Live Pathology
- Live Pathology
- Live Video
- Live Audio
- Online Chat
- Online Drawing
- Remote Sharing
- Data transfer

Images & Reports
- X-ray
- CT Scan
- MR
- CathLab
- ECG
- Pathological Report
- Patient Prescription

Database

Teledem Conferencing Unit

Medical Data Display Unit

Patient

X-ray Scanner

Printer

Event Recorder

12 Lead EKG M/C
Which Sector?

- **Government**
  - Motivation lacking

- **Private sector**
  - Not cost effective
    - The scars (of failed projects) remain
    - No time to learn
  - The physical patient is more important

- **NGOs?? -- PPP??**
Key is Change Management

- IT Projects succeed more due to the personnel (40%) rather than Technology (20%)
- Failure is always 100%
  - The simplest failures are the biggest
  - Hardware and esp Connectivity are big causes for failure

\[
\text{NT (New Technology)} + \text{OO (Old Order)} = \text{EOO (Expensive Old Order)}
\]
Digitizing the Patient Record

COMPONENT OF RECORD

- History
- Examination
- Investigations
  - Lab
  - X Ray/US/CT/MR
  - Histo/Cytopath
  - Others
- Invasive Procedures

IT COMPONENT

- Text
- Images
- Sounds
- Video Clips
- Wave Forms
- Video Conference
Telemedicine Streams

- Between Patients
- Patient → Doctor
- Local provider → Specialist
- Between Specialists
- Satellite Centres
SATHI Tsunami Project
- a case report

This project was conceptualized to provide Telemedicine based healthcare support to the tsunami victims in Tamilnadu
The partners

- **Oxfam** – Funding and administrative support
- **SATHI** – Technical support, designing and operationalization of telemedicine system
- **Local NGOs** – Implementation and coordination
- **Government of TN**
  - Service delivery
  - Frontline workers
  - Health subcentres/ PHCs
- **Specialists’ institutions** for actual Expert advice (SCARF, AIIMS)
Managing Change

Procedures followed

• Needs Assessment
• Check Background
• Concept marketing
• MOUs
• Installation
• Training

• Test Sessions
• Streamlining
• Create TCS Time Table
• Feedback
• Reporting Mechanisms

Outcome Analysis

Technology contribution to success - 20%
Project Outcomes

Developed operational Model of telemedicine that ensures access to needed healthcare services operable at village level sustainable

Capacity built : Community Health Team, NGOs, specialists institutions
Mental Health Services provided at community level

The project was handed over to the local NGOS in 2006 but is still being continued by them – even expanded to more areas. See www.scarfindia.org/tele.html
Images from our Tsunami Project

Psychiatrist advising a patient

Community workers sit with patient to listen to advice

A happy and recovered Arul with sister
Project learnings and current --

Problems in the past

- New Technology
- Service taking too long
  - Connectivity
  - Identification of Specialists
  - Identification of Caring Institution
  - NGO Coordination
- Costs /Funding
- Language Issues

Learning

- Not any longer
- Planning
  - Key factor -
  - Identify them early
  - Value add to existing projects (clean water)
  - Depend on yourself
  - Tag on to the CSCs
  - Get govt / CSR /Rotary or get someone to open the Gates (Foundation)
  - Think and act locally
Current project Goals

- Telemedicine supported hospital based Eye Surgery as a key supplement to the National Program for the Control of Blindness.
- 3 Tiered Approach
- Using the same system for data generation and planning
- Project to be made sustainable so that the centres can continue to run even after the project period is over
OVERVIEW

- Partners
  - Mizoram Govt
  - SATHI
  - Spanco
  - Aster Eyecare clinics
- Funding under NPCB
- Plan
  - Fixed vision centres run by trained ophthalmic assistants.
  - Surgery by Ophthalmologists in hospital
Tier 1 – *Current training program is for them*

Vision Centres in rural areas to
(run by trained Ophthalmic Assistants - OAs)

- Examine and review patients
- Fix appointments, arrange for patients transportation
- Do follow up - e.g., stitch removal and spectacles
Tier 2

- Eye Specialists in District Hospitals to
  - Provide Online Consultations
  - **Do Surgery** in the hospital
  - Provide training and support to staff at peripheral centres
  - Get help and online advice from friend doctors or Tier 3 Specialists in Guwahati, New Delhi (Aster Eye care) or even across the globe
Tier 0

- Specially trained Link workers (VHN/ASHA/Local Volunteers)
  - does the media plan and social marketing
  - maps the villages
  - encourage citizens to visit the centers
Back End

- Backup server set up at Aizawl as well as New Delhi
  - Separate Local servers at all centres
- Store and Forward for all data
  - *Cloud based services not possible due to patchy connectivity*
- Real Time linking and review (through VC and Desktop Sharing)
  - Central patient database updated through Synchronization / pipeline / Email
  - Operating doctor regularly (to be) updated on the progress
  - Data reviewed regularly for audit
We have started but

- 10 centres (+1)
  - Equipped the centres
  - Employed and trained the staff
  - Tested the equipment
  - Partly received connectivity
  - Consultations patchy
  - No government doctor

Further work (~ 1 yr)
- Ensure the connectivity
- Training on glasses
- Train and orient the doctors
- Add on services for sustainability

Plan for Phase 2

Tata Photon stops services in North East from Jan 18th 2013
Technical Problems Planned for

- Need for low cost technology
- Absence of, or unreliable connectivity
- No training and orientation
- Lack of proper hardware
- Maintenance and support of hardware and software
- Prioritizing funds for most suitable solution
- Erratic power supply
- Language barriers
Technical Problems Faced

- No connectivity
- Poor breakdowns (avg 4-6 hours per day)
- Poor reach (frequent landslides)
- Lack of Control on staff
- Poor control on Ophthalmic Assistants
- Need for retraining
- Maintenance issues
Other general problems

Problem

- Initial installation in District Hospital - not ideal for telemedicine
- Connectivity
  - Connectivity released in July 2013 for 5 centres

- Data Sharing not realtime

- Publicity

Solution

- Shifting done at extra cost but connectivity an even bigger problem
- Applied to all vendors – even personal towers
- Creation of a data USB courier service (through Drivers of inter village transport)
- Emphasis on store and forward as well as data synchronization
- Involving the local churches / local press
## Other general problems

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakages en route</td>
<td>Local sourcing/insurance</td>
</tr>
<tr>
<td>Lack of maintenance service</td>
<td>Extra training of OAs for such problems</td>
</tr>
<tr>
<td>Power problems</td>
<td>Installed 2 UPS at each centre – one for the IT equipment and one for fan etc</td>
</tr>
<tr>
<td>No official local Eye Surgeon to do the consultations</td>
<td>Involve other Eye surgeons for help - Aster Eye care doing free consultations as interim</td>
</tr>
<tr>
<td>OAs taking long leave</td>
<td>Extra incentives (rent, sweet talk)</td>
</tr>
<tr>
<td>Mismatch of cameras/software</td>
<td>Introduction of Mobiles with camera (Email/WhatsApp)</td>
</tr>
</tbody>
</table>
Other issues

- How much training of OAs is enough
  - Retraining schedule
  - Prevent poaching/ ensure they stay with us
  - Preventing charging for treatment – even non licensed practice
- Keeping government officers happy
- Keeping our own persons happy
- Non performance by project partners
  - No good eye surgeon (Govt)
  - Technology Implementation partner is not performing
Outcomes just about coming in
Pts – 500- 600 / mth & rising

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Location</th>
<th>19/08/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reiek</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Khazawl</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Kanpui</td>
<td>Leave</td>
</tr>
<tr>
<td>4</td>
<td>W.Phaileng</td>
<td>Leave</td>
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<tr>
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<td>S.khawbung</td>
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<td>7</td>
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<td>Leave</td>
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<tr>
<td>8</td>
<td>Tuipng</td>
<td>NO OA</td>
</tr>
<tr>
<td>9</td>
<td>S.Vanlaiphai</td>
<td>Leave</td>
</tr>
<tr>
<td>10</td>
<td>E.Lungdar</td>
<td>8</td>
</tr>
</tbody>
</table>

**Final musings**
- If connectivity is not present, one better not try
- Health is a higher need than Tele
- *Why one failed* may not have all the all answers, *How one succeeded* may
Working Solutions for Telehealth In Low Resource Area

Case Study II

Susil Kumar Meher
COMPUTER FACILITY
All India Institute of Medical Science, New Delhi, INDIA.
Need for this study

India is a vast country with varied geography (from deserts to frozen mountain ranges), maximum temp. touching 50 degree Celsius and in some northern regions mercury stays settled at below -20 degree Celsius round the year, population
Further this is compounded by the following factors like:

- High cost of health care and lack of investment for health care in rural areas.
- Inadequate medical facilities in rural & inaccessible areas.
- Problem of retaining doctors in rural areas where they are required to serve & propagate widespread health awareness.
- Specialist doctors cannot be retained at rural areas as they...
Why Telemedicine Is Required

- The TM technology is maturing fast.
- TM is getting accepted for its tangible advantages for the highly populated country.
- Govt. of India and other private players are looking at TM as a thrust area and are planning big investments on TM projects.
- Telemedicine is an upcoming technology in health sector, so...
  - Study will help in spreading awareness about telemedicine in rural population.
  - Further studies can be done to compare distance care with face to face care.
The management issues or the research questions here are:

1) What is doctors' Awareness and Attitude about Telemedicine?

2) What are the effective Awareness and Attitude perceived about Telemedicine?
Aims & Objectives

- To observe the existing facilities for patient care at All India Institute of Medical Sciences (AIIMS), New Delhi.
- To observe the existing facilities for patient care at All India Institute of Medical Sciences (AIIMS), New Delhi.
- To study the awareness and opinion of the physicians towards distance care technology.
- To study the awareness and opinion of the rural patients regarding distance care.
Methodology

- Collection of Primary Data and associated secondary data.
- Primary data collection by sample survey
- Secondary data collection by literature review and Internet
- Survey is by administering questionnaire among Doctors at AIIMS, New Delhi who are taking teleconsultation from other centres.
Existing Setup at AIIMS

ISDN → VSAT → MCU → Server → Departments

Departments:
- Cardiology
- Radiology
- Pathology
- Dermatology
- Pathology
- Emergency

Centres:
- IRCH
- RPC
- Dental College
- Trauma Centre
- CNC

LT's:
- LT 1
- LT 2
- LT 3
- LT 4

OT's:
- OT 1
- OT 2
- OT 3
- OT 4
ISRO’s Telemedicine Network

- 300 + Connectivity
- 25 Super Specialty
- 275 Rural Hospital

More to come:
- Rajasthan, Jharkhand, Uttarakhand, AP, UP, MP, Maharashtra and other States
DON’T COMMUTE.
.....COMMUNICATE

Towards a better world of Health & Justice

Supplement Infrastructure with INFOstructure
Types of Telemedicine Services at AIIMS

1. Tele-Radiology
   - Radiologists on call
   - Hospital Physicians
   - Primary care and rural physicians

2. Tele-Cardiology
   - Tele-Pathology
   - Tele-Ophthalmology
   - Tele-Dentistry
   - Tele-Psychiatry
     - Assessments and diagnosis
     - Treatment
     - Psychological testing
     - Medicolegal assessments
TM Implementation Model for India
Conclusions – Physicians perception and acceptance of TM in India

1. Physicians are keen to adopt new Technology.
2. Physicians Accept the need for TM.
3. Chronic Disease Mgt., CME, Preventive Care and Follow-up are felt effective TM applications.
4. TM improves continuity of care.
5. As better quality of care is in person only, the Tm practice to start with between specialist and the local Doctor.
6. TM saves time and travel.
7. TM saves life by providing expert opinion and due care during Golden Hour.
Limitations of the Study

1. Time period of 6 months
2. First of kind study in India
3. Response rate among physicians are normally low due to their busy schedule.
4. Response rate low in email systems
5. Non-inclusion of nursing and other Para-medicos due to time constraints
6. Regional samples not balanced
7. No. of users of TM is not large in India
Recommendations

1. Application of TM in area considered effective may be started on large scale

2. Health care needs of the rural population to be considered through TM

3. Govt. need to consider the proposal for launching dedicated satellites for use in TM & CME.

4. Further study on national level involving all sections of Health care professionals

5. Extending the study for more time or re-doing after few years to see the difference
Telemedicine services in rural areas – lessons from North Norway

Professor Gunnar Hartvigsen

Norwegian Centre for Integrated Care and Telemedicine, University Hospital of North Norway

Medical Informatics & Telemedicine Group, Department of Computer Science, University of Tromsø

Copenhagen, 23 August, 2013
Rural areas?
Where do I find a medical doctor?
Examples of telemedicine services in rural areas
Emergency medicine
Thus, we need to contact the specialist(s) on-line!
TeleENT
(Teleotorhinolaryngology)
Telepathology
Teleophthalmology
Teledermatology
“Eczema school”
Telerehabilitation
Teleorthopedic
Teleradiology
Teledialysis
Telepsychiatry
General equipment
- Video rack
Thank you for your attention!

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Telemedicine In Low Resource Areas

Maurice Mars

Dept of TeleHealth, Nelson R Mandela School of Medicine, University of KwaZulu-Natal, South Africa
The Problems

Burden of Disease
Shortage of health workers
Poverty
Population growth
Lack of Infrastructure
Cost of bandwidth
Government will
Civil unrest
The Problem

“Africa has 24% of the burden but only 3% of health workers commanding less than 1% of world health expenditure.”

WHO World Health Report 2006
The Shortage of Health workers
The Global Situation

Doctors per 100,000 people

African region 25
South-East Asia region 55
Eastern Mediterranean 108
Global Average 139
Western Pacific region 152
Region of the Americas 204
European region 333

WHO World Health Stats 2013
Population Growth
## Population Data (Millions)

<table>
<thead>
<tr>
<th>Region</th>
<th>1950</th>
<th>2010</th>
<th>2050</th>
</tr>
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<tbody>
<tr>
<td><strong>World</strong></td>
<td>2,526</td>
<td>6,916</td>
<td>9,551</td>
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<tr>
<td><strong>Africa</strong></td>
<td>228</td>
<td>1,031</td>
<td>2,393</td>
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<td><strong>Asia</strong></td>
<td>1,396</td>
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<td><strong>Europe</strong></td>
<td>549</td>
<td>740</td>
<td>709</td>
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<tr>
<td><strong>Latin America / Caribbean</strong></td>
<td>168</td>
<td>596</td>
<td>781</td>
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<tr>
<td><strong>Northern America</strong></td>
<td>172</td>
<td>346</td>
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<tr>
<td><strong>Oceania</strong></td>
<td>13</td>
<td>37</td>
<td>57</td>
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</tbody>
</table>

*Source: United Nations Population Division, World Population Prospects, 2012 Revision (Medium variant)*
Darkest Africa
The Problem

- High Telecommunication costs
- Low fixed phone line penetration
- Low internet penetration
- Literacy and computer literacy
- Language
## ICT Cost

Cost of a bundle of telephone, mobile phone, broadband as a percentage of GNI per month

<table>
<thead>
<tr>
<th>Country</th>
<th>Rank</th>
<th>Telephone</th>
<th>Mobile Cellular</th>
<th>Fixed Broadband</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niger</td>
<td>165</td>
<td>41.3%</td>
<td>73.4%</td>
<td>210.5%</td>
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<tr>
<td>Malawi</td>
<td>164</td>
<td>18.2</td>
<td>91.0</td>
<td>2,408.0</td>
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<td>S Africa</td>
<td>99</td>
<td>5.2</td>
<td>4.8</td>
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<td>UAE</td>
<td>5</td>
<td>0.1</td>
<td>0.2</td>
<td>0.8</td>
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<td>Monaco</td>
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<td>0.1</td>
<td>0.3</td>
<td>0.3</td>
</tr>
</tbody>
</table>

*International Telecommunications Union 2011*
Active mobile-broadband subscriptions / 100 People, 2007 - 2011

Source: ITU World Telecommunication /ICT Indicators database
No prior scans available for comparison. In my experience such an appearance warrants urgent surgical intervention.
Video Conference Consultation

75% of patients saved referral
Consultation
Dermatology
Ophthalmology
Orthopaedic Surgery
Psychiatry
Burns
Radiology
Neurosurgery
Digital Camera

< 1 megapixels

file size 140k
E-mail

Consent to share data
Concise history
Image attachments

< 500 kb
3 or 4 pics max

Issues
Confidentiality
Security
E-mail

Local experience

>85% of all images are adequate

>80% patients saved unnecessary transfer
Email Services

Ophthalmology
Email Services

Ophthalmology
Email Services

Jan 2004 – June 2006
282 cases

Not referred 55%
Elective transfer 27%
Referred 18%

Ophthalmology
Who Is Going To Do It?

“Extra work”

“Nice idea but I’m not going to do it”

“Not in my job description”

“What are you going to pay me”

“I don’t know anything about eHealth”
The Tipping Point

mHealth Alliance
Phone doctors under fire

The service is unethical, says health council

ROWANA SHEIK UMAR
and LEE RONDAGGER

TELEMEDICINE service provider Hello Doctor is withholding its "phone-a-doctor service" after coming under fire from the Health Professions Council of South Africa (HPCSA).

The HPCSA labelled organisations which offer a consultation with a doctor over the telephone as unethical. The Hello Doctor website offers phone-call diagnoses and prescriptions for lesser ailments for R99.

Such services are in breach of the prescriber-patient relationship, patient confidentiality and the principle of informed consent, registered with the SA Medical Association and the HPCSA.

Townsend said yesterday: "In the interests of our customers, clients and the doctor's patients, Hello Doctor will be withholding the tele-consultation services while we engage with the HPCSA."

Townsend said they were meeting with the council later this week.

Professor Maurice Marois, head Telehealth at the University of KwaZulu-Natal, said the HPCSA's definition of telemedicine was "weak".

"Regulators feel that telemedicine is new and unproven, and must be regulated to protect the patient. However, regulation requires clear and careful definition, and the HPCSA's communication is not clear," he said.
Telemedicine 'unethical', says HPCSA

The Health Professions Council of SA (HPCSA) telemedicine as unethical.

Organisations offering the services of a doctor just a call away were in breach of patients' rights, including the practitioner-patient relationship, patient confidentiality and informed consent, said HPCSA spokeswoman Bertha Peters-Scheepers.

HPCSA condemns telemedicine

The Health Professions Council of SA (HPCSA) condemned telemedicine as unethical.

Organisations offering the services of a doctor just a call away were in breach of patients' rights, including the practitioner-patient relationship, patient confidentiality and informed consent, said HPCSA spokeswoman Bertha Peters-Scheepers.

Recent initiatives offering the service had been noted with concern by the regulator, she said in a statement.
Guidelines – Who ?
Guidelines – When?

Level of Maturity
Guidelines – How?
ATA Guidelines
Practice guidelines for videoconference-based telepsychiatry in South Africa

J Chipps¹, S Ramlall², M Mars¹
¹Department of TeleHealth, University of KwaZulu-Natal, Durban, South Africa
²Department of Psychiatry, University of KwaZulu-Natal, Durban, South Africa
Power

Hooray! The fibre optic cable is here!!

Yeah! Right, now let's wait for the electricity....