Telemedicine for Rural Mass-Current Initiatives and Future Scope

Head, Dept. of Endocrine Surgery & Faculty I/C, SGPGI Telemedicine Programme
National Coordinator, National Medical College Network (NMCN) Project
Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS)
Lucknow, India
Email: skmishra@sgpgi.ac.in / skmishra_1956@yahoo.com
Agenda

- Current Initiatives for rural healthcare delivery
- Mobile Telemedicine
- Tribal Telemedicine in Himanchal Pradesh
- National Rural Telemedicine Network
- National Ayush Telemedicine Network
- CollabDDS
- Women Healthcare Mobile Outreach
- Tele-Ophtalmology, Tele-Radiology
- State Telemedicine Networks
- Policy & Future PAN India Telemedicine Practices
- Telemedicine in Temples
- Conclusion
Mobile Telemedicine Bus for Rural Healthcare Delivery

PGIMER Chandigarh (RRC) Asha Jyoti

AIMS Cochin

SGPGI's (NRC) Mobile Telemedicine Bus

Oditelecon2018; 22nd April 2018
Mobile Telemedicine Kiosk

Portable Mobile Telemedicine Kiosk

Yolo Health Kiosk

Oditelecon2018; 22nd April 2018
Sky Health Centers
World Health Partners & Melinda Gates Foundation
Impact India Foundation & Indian Railway

- Lifeline Express is WiFi enabled, which helps doctors and experts sitting in metropolitan cities examine patient’s diagnostic reports and other images

Swasthya Slate

SWASTHYA SLATE – LAB IN A RUCKSACK FOR OFF-GRID VILLAGE PRIMARY CARE

Swasthya Way of Diagnostics

http://www.iffcolive.com/this-small-tool-has-the-potential-to-change-indias-health-system

Oditelecon2018; 22nd April 2018
ATM Based Kiosk for Rural Healthcare

Yolo Health ATM and KIOSK
AmbuPod, a patent(pending) telemedicine enabled clinic and micro-Ambulance

http://www.ambupod.com/
Tribal Telemedicine at Himachal Pradesh

- Public Private Partnership (PPP) Model
- Apollo Tele Health services is providing 24/7, quality, affordable, remote health care, to 34,000 citizens of Lahaul and Spiti (height of 14,000 feet in the Himalayas) in Himachal Pradesh.
- People living there connected through satellite to specialists of Apollo Hospital sitting in New Delhi and Hyderabad.

http://caho.in/?p=3754
Telemedicine in the Himalayas: Operational Challenges—A Preliminary Report
doi:10.1089/tmj.2015.0249
Tribal Telemedicine in Himanchal Pradesh

National Rural Telemedicine Network

Hierarchical Structure of NRTN

**LEVEL-1:** Primary Health Center (PHC) / Community Health Center (CHC) connected to a District Hospital

**LEVEL-2:** District Hospital connected to a State Hospital / National Super Specialty Hospital

**LEVEL-3:** State Hospital / National Super Specialty Hospital connected to each other

**LEVEL-M:** Mobile Telemedicine Unit covering few villages connected to nearest PHC / CHC or directly to District Hospital

Oditelecon2018; 22nd April 2018
National Rural Ayush Telemedicine Network

- Network of telemedicine centers acting as next generation delivery point for AYUSH treatment at District Health Centers and Public Health Centres.
- Ensuring accessibility to good quality healthcare at the doorstep these centers minimize the gap in the Health Sector in Bihar and seeks to promote the benefit of healing to a larger population in a natural way under AYUSH system of medicine.
Collabdds
Developed by NIC, Pilot Test funded by NKN & PAN India Expansion by MoH&FW

https://collabdds.gov.in/
Women Healthcare Mobile Outreach

- PGIMER, Chandigarh & Clinton Foundation in association with Philips Healthcare & RAD-AID International
- Integrated mobile women's health outreach program to provide screening and referral for breast cancer, cervical cancer, and osteoporosis to over 7,000 underserved patients over five years in Northern India, in the Punjab province and City of Chandigarh

https://www.clintonfoundation.org/clinton-global-initiative/asha-jyoti-womens-healthcare-mobile-outreach-program

Oditelecon2018; 22nd April 2018
Tele-Ophthalmology

- **Srikiran Institute of Ophthalmology** connect satellite clinics with the main hospital to treat ophthalmology patients from different districts where specialized care is not available.

Tele-Eye Care Service in CHC

- Public Private Partnership (PPP) with Apollo Hospitals for services.
- In the first phase, these services would be available in 60 community health centres of the State and later it would be expanded to the remaining 55 health centres.
- Eye care will be provided through digital medical equipment and telecommunications technology, even when a patient is at a remote health centre.

Chief Minister N. Chandrababu Naidu undergoing eye test after launching tele ophthalmology services, e-eye kendra at Undavalli in Guntur district (Feb, 2018)
Tele-Ophthalmology Network
Tele-Radiology for Tripura

- Telerad in MoU with Govt. of Tripura.
- Begins in Sep 2016
- Reported 15662 cases in between Sept 2016-Aug 2017
- Provides services to 23 sites in the state

Common Service Center Scheme (CSC)

http://164.100.115.10/health/?page_id=23
State Telemedicine Networks
Odhisa State Telemedicine Network


Oditelecon2018; 22nd April 2018
Statistics at a Glance
(Odhisha State Telemedicine Network)

- Total number of tele-consultations and tele-follow ups till end of May 2017 are 16,556.

- During the period from August 2001 to May 2017 sixteen batches of postgraduate trainees have been benefited in the three Govt. medical colleges of Odisha through online teaching on 3141 topics.

- The State Institute of Health & Family Welfare, Bhubaneswar has conducted till end of May 2017 a total number of 490 training courses for benefit of medical professionals and para-medical staff of different districts.

Maharashtra State Telemedicine Network

Control node
Sir J.J. Hospital Mumbai

Speciality node
06 Medical Colleges

62 Patient Nodes
23 District Hospital + 39 Sub District / Rural Hospitals

https://www.nrhm.maharashtra.gov.in/telemed.htm

Oditelecon2018; 22nd April 2018
### Physical Progress Report

<table>
<thead>
<tr>
<th>Year</th>
<th>Total No. of Patient Referred/Opinion received</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-09</td>
<td>538</td>
</tr>
<tr>
<td>2009-10</td>
<td>3640</td>
</tr>
<tr>
<td>2010-11</td>
<td>4243</td>
</tr>
<tr>
<td>2011-12</td>
<td>16109</td>
</tr>
<tr>
<td>2012-13</td>
<td>21135</td>
</tr>
<tr>
<td>2013-14</td>
<td>27884</td>
</tr>
<tr>
<td>2014-15</td>
<td>26572</td>
</tr>
<tr>
<td>2015-16</td>
<td>31980</td>
</tr>
<tr>
<td>2016-17</td>
<td>4238</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>136339</strong></td>
</tr>
</tbody>
</table>

### Health institutes included for Telemedicine Project:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Controlling node</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Specialist node</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Patient node</td>
<td>5</td>
<td>22</td>
<td>30</td>
<td>5</td>
<td>62</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>6</strong></td>
<td><strong>26</strong></td>
<td><strong>31</strong></td>
<td><strong>6</strong></td>
<td><strong>69</strong></td>
</tr>
</tbody>
</table>

[https://www nrhm maharashtra gov in telemed htm](https://www.nrhm.maharashtra.gov.in/telemed.htm)
Punjab Telemedicine Network

- Punjab Health system under Ministry of Health & Family Welfare (MoH&FW)
- Telemedicine Project, Punjab was launched on pilot basis at the three Hospitals of Punjab with the aid of ISRO and the assistance of PGIMER using Satellite technology (V-SAT) on 13.04.2005
- Web Based eSanjeevani Telemedicine Software Developed by Center for Development and Advance Computing (CDAC), Mohali
- All District Hospitals and Three Medical Colleges in the States are connected to Post Graduate Institute of Medical Sciences (PGIMER)

http://punjabhealth.co.in/RSBY_overview.aspx?ID=qpbhdKadhac=
## Statistics at a Glance
(Punjab Health State Network)

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of consultations</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. 2008</td>
<td>450</td>
</tr>
<tr>
<td>ii. 2009</td>
<td>814</td>
</tr>
<tr>
<td>iii. 2010</td>
<td>4141</td>
</tr>
<tr>
<td>iv. 2011</td>
<td>3962</td>
</tr>
<tr>
<td>v. 2012</td>
<td>3827</td>
</tr>
<tr>
<td>vi. 2013</td>
<td>4073</td>
</tr>
<tr>
<td>vii. 2014</td>
<td>4677</td>
</tr>
<tr>
<td>viii. 2015</td>
<td>8641</td>
</tr>
<tr>
<td>ix. Till August 2016</td>
<td>6109</td>
</tr>
</tbody>
</table>

### Telemedicine Centres in Punjab

1. Govt. Medical College Amritsar.
2. Govt. Medical College Patiala.
3. Govt. Medical College Farnidkot.
4. Civil Hospital Amritsar.
5. Civil Hospital Bathinda.
6. Civil Hospital Barnala.
7. Civil Hospital Ferozepur.
8. Civil Hospital Fatehgarh Sahib.
9. Civil Hospital Gurdaspur.
10. Civil Hospital Hoshiarpur.
11. Civil Hospital Jalalpur.
12. Civil Hospital Kapurthala.
13. Civil Hospital Ludhiana.
14. Civil Hospital Mansa.
15. Civil Hospital Moga.
16. Civil Hospital Muktsar.
17. Civil Hospital Nawansahar.
18. Civil Hospital Ropar.
19. Civil Hospital Sangrur.
20. Civil Hospital SAS Nagar.
21. Civil Hospital TarnTaran.
22. Civil Hospital Pathankot.

**ISRO Assisted Centres:**

1. Mata Kaushalya Hospital, Patiala
2. SDH Dasuya, Hoshiarpur,
3. SDH Ajnala, Amritsar

---

http://punjabhealth.co.in/downloads.aspx?ID=+z+5eVU00Fc=&&Header=8ZK01RUjWG/QF09l0wFTy4UoKW19DMjI

Oditelecon2018; 22nd April 2018
Policy & Future PAN India Telemedicine Practices
Health Policy implementation

National Health Protection Scheme

- Will be the world’s largest government funded health care programme
- Covering over 10 crore poor and vulnerable families
- Providing coverage upto 5 lakh rupees per family per year for secondary and tertiary care hospitalization
Wellness Scheme under Ayushman Bharat Yojana (National Health Protection Scheme)

- Hon’ble PM Launches First Wellness center under Aushman Bharat Yojana in Maoist Area at Bijapur (Chattisgarh) on 15th April 2018
- Government plans to open 1.5 lakh health and wellness centres by 2022 to deliver comprehensive primary healthcare to communities.
- Provide insurance cover to 40% of India’s population for secondary and tertiary care
DigiGaon initiative

- It will be launched which aims at provision of telemedicine, education and skills using of digital technology.
- Aim to double the income of the farmers by 2022
- Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) is extended to 6 Crore rural households to accomplish the mission of DigiGAON
- The effective digitization of rural India will be the key of success for Digital India or DigiGaon initiative.
- Akodara in Gujrat, the first DigiGaon of India
National Health Mission (NHM)

National Rural Telemedicine Network (NRTN)

Telemedicine in Sub-center, PHC, CHC, DH

- Design, development and implementation of
  - Low cost rural telemedicine infrastructure
  - Village Tele-ambulance System and rural emergency healthcare services/ Trauma care module
  - Rural Health Knowledge Resource through web portal and e-CME module
  - Technology platform for harvest, compilation, storage (DataBase) at Regional District Hub and Central Data Center at MOH & FW, archive and distribution across network

www.mohfw.nic.in/National%20Rural%20Telemedicine%20Network%20for%20India-...
Digital India Mission

NATIONAL HEALTH PORTAL
Gateway to authentic health information

- Hospital Near You
- Ambulance Services
- Blood Banks
- Emergency Helpline
- Healthy Living

Oditelecon2018; 22\textsuperscript{nd} April 2018
CALL 1056
Health Helpline NRHM

Direct Intervention System for Health Awareness
National Cancer Grid (NCG)

Tata Memorial Centre and National Cancer Grid and Navya bring you evidence based expert treatment decisions.

Navya has accurately made over 18,000 expert treatment decisions in oncology.

Get an expert opinion in 1 to 3 days from Asia's largest leading expert cancer centers.
National Medical College Network

07 Regional Resource Center (RRC) & 01 National Resource Center (NRC)

Promote telemedicine through e-Education and e-Healthcare delivery

Connect 41 Government Medical Colleges to National Knowledge Network (Phase 1)

Will connect remote 500 PHC/CHC/SDH to 50 District Hospitals

OBJECTIVES IN SIGHT

NATIONAL MEDICAL COLLEGES NETWORK PROGRAMME

#TransformingIndia

www.nmcn.in
Network Architecture
National Medical College Network
National Resource Center (NRC)  
SGPGIMS, Lucknow  

Tele-presence Suite for Surgical skill sharing 

Sharing of Surgery at Multiple Location 

Oditelecon2018; 22nd April 2018
National Resource Center (NRC)
SGPGIMS, Lucknow

Inner View of Integrated Operation Theatre
E-Tumour Board & Decision Support System

- Live Robotic Surgery was also transmitted from Korea.
- Doctors connected from different parts of countries in Real Live Interactive Mode as well as through Mobile and Desktop; Live Streaming available through NMCN portal.
Tele-Radiology (CollabDDS)

- National Informatics Centre, New Delhi, All India Institute for Medical Science, New Delhi, Indian Institute of Technology-Bombay and Council of Scientific, Industrial Research (CSIR) joined together for the effective development of CollabDDS application.

Centers
- PGIMER, Chandigarh
- JIPMER, Puducherry
- SGPGI, Lucknow, UP
- KEM Medical College & Hospital, Mumbra, Maharashtra
- AIIMS, New Delhi
- NEIGRIHMS, Shillong, Meghalaya

http://www.collabdds.gov.in/
Tele-Rheumatology
Nuclear Medicine Followup Tele-Clinic
Telemedicine at Temples

At the request of the Indian government, telemedicine services have been launched at temples across the country. This is to ensure medical aid for devotees at these places.

Aiming to provide medical services to people seeking spiritual solace, the Indian government has launched telemedicine services at various temples. This initiative aims to provide emergency medical aid and consultation to devotees at these sacred places.

Devotees do not find it difficult to access medical care in their own city. But this initiative will ensure that medical facilities are available even when people are physically present at temples.

A few temples have already launched telemedicine services. As of now, the government has started the free medical consultation service at the Mahakal temple in Ujjain.

This initiative will also provide additional benefits to the people coming to these temples. These people usually shoulder the burden of diseases in their daily lives. This initiative will ensure that people even at a distance from their doctor get access to medical treatment.

A few temples have already started telemedicine services. As of now, the government has started the free medical consultation service at the Mahakal temple in Ujjain.

This initiative will also provide additional benefits to the people coming to these temples. These people usually shoulder the burden of diseases in their daily lives. This initiative will ensure that people even at a distance from their doctor get access to medical treatment.

This initiative will also provide additional benefits to the people coming to these temples. These people usually shoulder the burden of diseases in their daily lives. This initiative will ensure that people even at a distance from their doctor get access to medical treatment.
OVER YEARS, VARIOUS STATE GOVERNMENTS’ AND THE HEALTHCARE INDUSTRY HAVE BEEN PARTNERING TO MAKE SEVERAL SERVICES AVAILABLE TO THE MASSES

**Punjab**
Construction and operation of new super specialty hospitals in Mohali and Bhatinda, Punjab – Max Hospital

**Uttaranchal**
Mobile health clinics in collaboration with Uttaranchal Institute of Scientific research, Bhimtal (NGO)

**Rajasthan**
Diagnostic PPP with Sawai Mansingh Hospital and Soni Hospital. Public Health Engineering Department, Rajasthan is also involved in the development of a multi-specialty hospital in Jaipur district under PPP

**Bihar**
State of Bihar Initiated an unique telemedicine project for delivering service in alternative medicine – Ayurveda, Yoga, Unani, Sidha & Homeopathy (AYUSH)

**Kerala Telemedicine Network**
Onconet - Cancer Care For Rural Masses, (in six hospitals), Telemedicine Kerala for Taluk hospitals (in eight hospitals). Telehealth and Medical Education Kerala (in 18 hospitals), Rural Telemedicine Project for primary care in Tirur taluk (in 11 hospitals)

**Andhra Pradesh**
B Braun PPP for dialysis. PPP Model: Eleven dialysis centres were established in district hospitals – in Chittoor, Guntur, Hyderabad, Kakinada, Kurnool, Srikakulam, Vijayawada, Visakhapatnam and Warangal.

**Tamil Nadu**
Nexus PPP with government for one centre with 15 dialysis machines. Apollo PPP with one centre and nine dialysis machines

© Confederation of Indian Industry
Tele-medicine in collaboration with D/o Space at Pilgrimages

- MoHFW in collaboration with D/o Space has established a Telemedicine Node at Pampa hospital at the base camp of Ayappa pilgrimage which is interlinked with existing Telemedicine Node at JIPMER, Pondicherry and Govt. Medical College, Kozhikode (Calicut) for providing remote super speciality healthcare services.

- Telemedicine node has been setup at CHC, Pooh, Himachal Pradesh interlinked with PGIMER, Chandigarh with the purpose of providing access to speciality care to citizens inhabited at snowbound locations.

- MoHFW is in process of replicating this Tele-medicine model at Chardhams, Kedarnath and Amarnath temples and has proactively taken State Government and Department of Space on board for successful and smooth implementation.
TAKING HEALTHCARE SERVICES TO ALL

A look at the centres set up in hard-to-reach areas this month, projects in the pipeline and the previous projects where ISRO provided satellite links to connect the centres to hospitals in cities.

AMARNATH CAVE
The node was established at Sheshnag base camp of the Amarnath Shrine for providing tele-consultation facility to devotees visiting Amarnath shrine, interlinking specialty hospitals PGI Chandigarh and SKIMS, Srinagar.

J&K
- Srinagar
- Jammu
- Kathua
- Kupwara
- Doda
- Poonch

CHHATTISGARH
- Jagadalpur
- Raipur
- Marwahi

KERALA
- Pattanamthitta
- Pampa

LAKSHADWEEP
- Kavaratti
- Minicoy
- Androttii
- Ameni
- Agatti

DISTRICT KINNAUR
Teledicine node established at Community Health Centre (CHC), Pooh, to inter-link with existing node at PGI, Chandigarh through satellite communication.

KEDARNATH AND BADRINATH SHRINES
The authorities are waiting till weather clears to install equipment at these nodes.

NORTH EAST
- Gangtok
- Guwahati
- Imphal

WEST BENGAL
- Krishnanagar
- Cuttak
- Berhampur

ODISHA
- Borda

ANDHRA PRADESH
- Srikakulam
- Aragonda

KARNATAKA
- Chamranagar
- Saragur

AYAPPA PILGRIMAGE, SABARIMALA
Teledicine node established at Pampa Hospital at the base camp of Ayappa pilgrimage, interlinked with existing node at JIPMER, Puducherry, and Government Medical College, Kozhikode.

ANDAMAN AND NICOBAR
- Port Blair
- Car Nicobar
Network Readiness

- National Knowledge Network (NKN)
- National Optic Fiber Network (NOFN)
- State Wide Area Network (SWAN)
Conclusion

- Indian Telemedicine Programme is getting matured with indigenous technology, system and process.
- Digital India Mission has further strengthened the policy for adoption of telemedicine in Indian Health Delivery System.
- However, Large country with over billion population, diverse social and cultural background, federal nature of governance where health is a state subject are acting as impediments for rapid acceptance.
- Difficult Geographical regions - North and North East, Deserts and Rural Communities having poor connectivity are challenges.
- Rapid deployment of Mobile Broad Band and reducing cost of Smartphones hold great promise for mHealth deployment in rural settings and home.
Thank You