Telemedicine Application for Medical Services

Dr. Asif Zafar
MBBS, MCPS, M.D. FRCS, FCPS
Professor of Surgery,
Rawalpindi Medical College
Director, Telemedicine & E- Health Training Center,
MIS Virtual Training Lab, Holy Family Hospital, Rawalpindi
President Society of Surgeons Pakistan Rawalpindi –Islamabad
Founder Member & Past President e – Health Association of Pakistan
Outline of today’s presentation

- E Health Basic –Facts
- Telemedicine Application for Medical Services
  - Trauma / Emergency
  - Tele Surgery
  - Tele Pathology
  - Tele Radiology
  - Tele Cardiology
  - Multi Disciplinary Meetings : Tele Oncology / Tumor Boards
- Tele Education
eHealth Definition

- “the cost-effective and secure use of ICT in support of health and health-related fields, including healthcare services, health surveillance, health literature, and health education, knowledge and research”. (WHO-2007)

- “eHealth describes the application of information and communications technologies across the whole range of functions that affect the health sector, from the doctor to the hospital manager, via nurses, data processing specialists, social security administrators and - of course - the patients”

- – EU ICT
eHealth Applications

- **Telehealth / Telemedicine**
  - Use of ICTs to deliver health services, expertise and information over distance

- **e-Learning**
  - Delivery of individualized, comprehensive, dynamic learning content in real time, aiding the development of CMEs, and linking with experts.

- **Health Informatics**
  - Deals with storage, retrieval and optimal use of biomedical data, information, and knowledge for problem solving and decision-making
Telemedicine

Human resource

SYNERGY

Tools

Connectivity
TELEMEDICINE METHODOLOGY

• Asynchronous (Store & Forward)
• Synchronous ((Video Conferencing)
Clinical Applications

• Meeting patient needs
• Streamlining care
• Enabling better outcomes
Clinical Applications

- Trauma / Emergency
- Radiology
- Pathology
- Dermatology
- Psychiatry
- Cardiology
- Surgery
- Primary Care
Radiology

- Picture Archiving System – PACS
- Digital Image Communications in Medicine (DICOM)
- Standards
- Image Acquisition
Radiology

• Compression
• Storage
  - X-ray size 2K x 2K, 12bits, 4 images per exam, average storage requirement is 128MB
• Interpretation
Pathology

- Imaging systems
- Standards
- Image Acquisition
- Compression
- Storage
- Transmission
- Interpretation
Dermatology

- Non Invasive methods
- New age Digital Cameras
- Image can be interpreted by a dermatologist
- Can be compared to a digital atlas
- Good for dermatological manifestations of
  - Metabolic
  - Toxicological
  - Oncological
  - Inflammatory
Psychiatry

- Earliest application of telemedicine
- Advances in Videoconferencing equipment
- Same psychiatrist even when traveling
Surgery

- Pre-op
- Tele-proctoring
- Tele-mentoring
- Tele-presence
- Post-op
- Anesthesia
Surgery Example

“This is the area I’m concerned about. What are your thoughts?”
Clinical Applications

- Medical Education
  - Web-based EMRs
  - IP tools and methods
  - International
Innovative Tools for Education

- Streaming Media
- Web-based educational tools
- On-line CME
- Distance learning via the Internet
- Increased access
Clinical Applications

- Medical Education
- Natural Disasters
- Space
- Military
- Refugee
- Corrections
Telemedicine
Medical Applications

Examples
Case Studies
National Rural Support Program Pakistan (MOIT Health Net 2007-2012)
Facilities at all centers
# Telemedicine Schedule

## Speciality Weekly Teleconsultation Schedule, HFH

<table>
<thead>
<tr>
<th>Days</th>
<th>Regular Consultation Sites</th>
<th>Emergency Consultations Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Timing</td>
<td>Jhang</td>
</tr>
<tr>
<td></td>
<td>ATTOCK</td>
<td>Gyne Paediatric</td>
</tr>
<tr>
<td></td>
<td>PINDICHEB</td>
<td>Gyne Paediatric</td>
</tr>
<tr>
<td></td>
<td>KHUSHAB</td>
<td>Gyne Paediatric</td>
</tr>
<tr>
<td></td>
<td>D.G. Khan</td>
<td>Gyne Paediatric</td>
</tr>
<tr>
<td></td>
<td>IOM Sites</td>
<td>R.Y Khan Mithan Kot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mon 08 am to 11:00 am 11:00 am to 2:00 pm**

- **Attock**: Gyne Paediatric
- **Pindicheb**: Gyne Paediatric
- **Khushab**: Gyne Paediatric
- **D.G. Khan**: Gyne Paediatric
- **IOM Sites**: R.Y Khan Mithan Kot

**Emergency on call**

- Jhang: Gyne Paediatric
- Rajan Pur: Gyne Paediatric
- Gujrat: Gyne Paediatric

**Special Notes**

- Tumor Board Meeting NORI with HFH (8am to 9:30 am)/CME Program Each Site per Week (Last Friday)
- Surgery Joint Meeting R.Y Khan

---
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>107</td>
<td>48</td>
<td>56</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>211</td>
</tr>
<tr>
<td>Cardiology</td>
<td>68</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>84</td>
</tr>
<tr>
<td>Ortho</td>
<td>30</td>
<td>302</td>
<td>334</td>
<td>12</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>709</td>
</tr>
<tr>
<td>Dermatology</td>
<td>252</td>
<td>784</td>
<td>432</td>
<td>36</td>
<td>61</td>
<td>89</td>
<td>21</td>
<td>25</td>
<td>60</td>
<td>17</td>
<td>0</td>
<td>1700</td>
</tr>
<tr>
<td>ENT</td>
<td>123</td>
<td>868</td>
<td>900</td>
<td>42</td>
<td>89</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>40</td>
<td>0</td>
<td>6</td>
<td>2039</td>
</tr>
<tr>
<td>Pead</td>
<td>6</td>
<td>2</td>
<td>102</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>110</td>
</tr>
<tr>
<td>G.Surgery</td>
<td>30</td>
<td>50</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>94</td>
</tr>
<tr>
<td>Gynee</td>
<td>43</td>
<td>207</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>272</td>
</tr>
<tr>
<td>Neurology</td>
<td>3</td>
<td>26</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>39</td>
</tr>
<tr>
<td>Plastic Surgery</td>
<td>0</td>
<td>12</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>X-Rays</td>
<td>0</td>
<td>127</td>
<td>488</td>
<td>9</td>
<td>44</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>668</td>
</tr>
<tr>
<td>Urology</td>
<td>3</td>
<td>16</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>22</td>
<td>298</td>
<td>1144</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>21</td>
<td>62</td>
<td>0</td>
<td>1547</td>
</tr>
<tr>
<td>Hemophilia</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Psychiatry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>781</strong></td>
<td><strong>2762</strong></td>
<td><strong>3504</strong></td>
<td><strong>99</strong></td>
<td><strong>215</strong></td>
<td><strong>95</strong></td>
<td><strong>22</strong></td>
<td><strong>44</strong></td>
<td><strong>130</strong></td>
<td><strong>88</strong></td>
<td><strong>7</strong></td>
<td><strong>7747</strong></td>
</tr>
</tbody>
</table>

New Clinic Start 24 June 2011
Trauma / Early Intervention!
Surgical Emergencies!
Emergency Consultation Trauma

[Images of medical consultations and injuries]
Emergency Consultation Trauma
Digital Ultrasound Training For Afghan Doctors
Primary Care: Otolaryngology
Primary Care: Dermatology
Tele Pathology : Holy Family – Harvard
Tele - Education
Tele - Education

MEDICAL EDUCATION

- Distance Learning
- Lecture of the week
- Surgical Atlas
- Tutorials
TELEMEDICINE APPLICATIONS

MEDICAL EDUCATION

- Distance Learning
  Lecture of the week

Surgical Atlas

Tutorials
TELEMEDICINE APPLICATIONS

MEDICAL EDUCATION

- Distance Learning
- Lecture of the week
- Surgical Atlas
- Tutorials
TELEMEDICINE APPLICATIONS

MEDICAL EDUCATION

Demonstration of Procedures Online
e Learning!
Tele – Education DPRK
Tele Surgery

- Tele surgery involves a surgical procedure with the surgeon being situated remotely from the patient.

- For tele-surgery robotic platforms (Da Vinci) were designed using connections that permitted surgery to be performed with the surgeon at a console at a distance from bedside robot and patient in operation theatre.

- This permits the surgeon to perform surgery in another room, another building or another continent.
Robotic Platforms

- Robotic platforms (Da Vinci) were designed using connections that permitted surgery to be performed with the surgeon at a console at a distance from the bedside robot and patient in operation theatre.
On September 7, 2001 a doctor in New York removed the diseased gallbladder of a 68-year-old patient in Strasbourg, France. He did so by remotely operating a surgical robot arm.
Telementoring

- Telementoring involves procedural guidance of one professional by another from a distance using telecommunications. This involves audio dialogue, video demonstrations, and in some cases surgical robots. It is feasible and relatively inexpensive, and widespread adoption would require an evolution in surgical thinking.
Tele Surgery Example

“This is the area I’m concerned about. What are your thoughts?”
Tele – Education : Minimal Access Surgery Training Program
HEC Collaboration
Instrument Navigation
Clip Application
Minimal Invasive Surgery Training
Tumor Boards / Tele-Oncology

- Scholnik, et al., defines tumor boards as “multidisciplinary conferences convened for the discussion of cancer patients.”

- “Tele-Oncology may be defined as the delivery of clinical oncology services from a distance, often using an interactive video telecommunications system”
  (Doolittle & Allen, 1997, p. 63)
Conventional Surgical Oncology Practice

- Time consuming: delay in management of the patients
- Patients being managed without input from Oncologists / surgeons Team
Tumor Board Meetings Nori Hospital
Methodology

HFH
Surgeons, Radiologists & HistoPathologists
All new Cancer patients (Indoor / Out door)
Requiring Oncological Opinion during Management

NORI
Oncologists / Radiology / Pathology
New and Referred Patients
Requiring Surgical Opinion/Intervention during management
Methodology

Consultative Process

• Case selection: Consultants

• Allocation to one Resident
  • Power point presentation
  • History & Examination
  • Radiological & Histopathological Description
  • Proposed Management Plan

• Final Plan
Final Treatment Strategy
Holy Family : NORI
Weekly MDM meetings

Some Examples !
Multi Disciplinary Meeting
(Telemedicine Connects !!)
Surgery / Radiology / Oncology / Pathology
Referral from Remote Site: Attock

- **Left abdominal mass tumor in un descended testis**
- **USG Abdomen & pelvis**
  Echo mixed mass 13 x 10 cm in size in left supra inguinal region. Rest NAD
  No lymphadenopathy.
- **Tumor markers**: Beta-HCG levels – raised, LDH levels: Normal.
- **CT Scan abdomen & pelvis**
Multi Disciplinary Meeting
Ewings Sarcoma MDM
Conclusion

- Telemedicine has found application in every discipline of medicine
- Technology has made possible the use in healthcare
Thank you!