Telemedicine
Promises and Challenges
Global Health Implications

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Mehari Gebreyohanns, M.D.
Assistant Professor Neurology and Neurotherapeutics
I. Definitions
   a) Telemedicine
   b) Asynchronous Vs Synchronous

II. History of Telemedicine

III. Current Applications

IV. Promises

V. Challenges

VII. The Global angle
A. Telemedicine

“the delivery of healthcare services at a distance using information and communication technologies”.

- patient/health professional
- health professional/health professional
- not in the same location
- secure transmission of data
B. Asynchronous Vs Synchronous

Asynchronous: “store and forward”

Synchronous: real time/live and interactive
History of Telemedicine
History of Telemedicine: 1844
History of Telemedicine: 1876
History of Telemedicine: April 1924
History of Telemedicine: 1927
History of Telemedicine: 1990’s
History of Telemedicine
History of Telemedicine
History of Telemedicine
Current application: Telepathology
Current application: Telestroke
Current application: Teledermatology
Current application: Teleophth
Current application: Telepsych
• Availability of technology
Cost.....policy
screening for diabetic retinopathy 35% less
increased health care extender utilization
“virtual visits”
• Younger people open to tech use
• Educational opportunities / distance
• Research
Faster access to care – “Amazon-ization”
• Mobile Stroke Unit
• Nation's First Mobile Stroke Unit Successfully Transports First Patient

HOUSTON, June 4, 2014 /PRNewswire-USNewswire/
• Our program – The Hub Spokes:
  1. GSMC Marshall
  2. GSMC Kilgore
  3. Texas General Grand Prairie
  4. St. Paul University Hospital
- Example: Marshall
- Started 9-15-2013
- 125 Telestroke consults
- 13 patients treated with IV tPA
• Lack of “Real” human interaction
  - reliability (efficacy)
  - outcomes
• Efficacy: STRokE DOC trial
  - randomized, blinded, prospective
  - to telemedicine or telephone – 234pts
  - more decisions tm 98.2%, tp 82% (p=0.0009)
  - IV tPA use tm 28%, tp 23% (p=0.4248)
  - no mortality or functional outcome difference
  - no ICH rate difference
  - non complete data 3.1% tm, 12% tp (p<0.001)
Challenges

- Billing and Reimbursement
<table>
<thead>
<tr>
<th>STATE</th>
<th>YEAR OF ENACTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>1996</td>
</tr>
<tr>
<td>Colorado</td>
<td>2001</td>
</tr>
<tr>
<td>Georgia</td>
<td>2006</td>
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<tr>
<td>Hawaii</td>
<td>1999</td>
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<td>Maine</td>
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<tr>
<td>Oregon</td>
<td>2009</td>
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<tr>
<td>Texas</td>
<td>1997</td>
</tr>
<tr>
<td>Virginia</td>
<td>2010</td>
</tr>
<tr>
<td>Michigan</td>
<td>2012</td>
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**Challenges**
<table>
<thead>
<tr>
<th>State</th>
<th>Legislative Status</th>
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<tbody>
<tr>
<td>Florida</td>
<td>S.B. 1842, H.B. 60</td>
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<tr>
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<td>Ohio</td>
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<td>Pennsylvania</td>
<td>H.B. 273</td>
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<tr>
<td>Vermont</td>
<td>H.B. 37</td>
</tr>
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</table>

H.B., House Bill, S.B., Senate Bill.
Challenges

- Sustainability
  A. as a mainstream service
  B. as a gateway to the institution
  C. as an intra or interstate regional resource

Bashur et. al
Challenges

- Legal: malpractice, privacy, consent
Consent

TPA for Cerebral Ischemia within 3 Hours of Onset-Changes in Outcome Due to Treatment

Changes in final outcome as a result of treatment:
- Normal or nearly normal
- Better
- No major change
- Worse
- Severely disabled or dead

Early course:
- No early worsening with brain bleeding
- Early worsening with brain bleeding
• Technology/Connectivity
  - bandwidth 128kB/s – 764kB/s
• BIG Challenges and Rewards
• Challenges
  - poverty = low expenditure
  - poor infrastructure
  - 24% of the burden but only 3% of health workers, less than 1% of world health expenditure (World Health Report of 2006)
  - population to double in next 40 yrs
  - 60% live in rural areas
Applications

- **TELE RADIOLOGY CONSULTING**
  - **Identification**
    - Card Number: 2435/98
    - Age: 45
    - Sex: Male
    - Marital Status: Married
    - Occupation: Merchant
    - Address: Yirgalem

- **Patient Clinical History**
  - Cough, fever and night sweating of 02 months. Hx of significant weight loss.

- **Treatment (if given)**
  - Antibiotics and analgesic.

- **Relevant Lab. Information**
  - ESR 100mm/hr
  - WBC 7500
  - N=50%
  - L=40%
  - M=05%
  - E=05%

- **Previous related imaging findings**
  - No

- **Consulting Physician Impression**
  - Pulmonary TB R/O Bronchogenic Carcinoma

- Refferring Physician: Dr. Zelalem Assefa
- Date of Consultation: 09/03/06
Applications

Global

Courtesy of Dr Fouad Temam
- Cardiology- Tele EKG, ECHO
- Pathology- mobile phone, ipath (web based)
- Obstetrics- cervicography (screening)
- Psychiatry- Skype
- Ophthalmology- slit lamp, eye test chart, DR
- Tele education- webcasts etc.
• Telemedicine is an efficient and cost effective mechanism of health care delivery to an otherwise underserved populations.
• The need for telemedicine is even more critical in global health especially in impoverished parts of the world such as Subsaharan Africa.
• Increasing access to less expensive technology such as mobile phones probably will play a more critical role.

• The challenges of delivery are enormous but the rewards are equally great since many of the problems probably are easy to diagnose.
It is a beautiful world !!!

- Tees Abbay “The Smoking Nile”