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Digital Imaging and Communications in Medicine

Clinical Telemedicine and Telecardiology, with emphasis on rural impact

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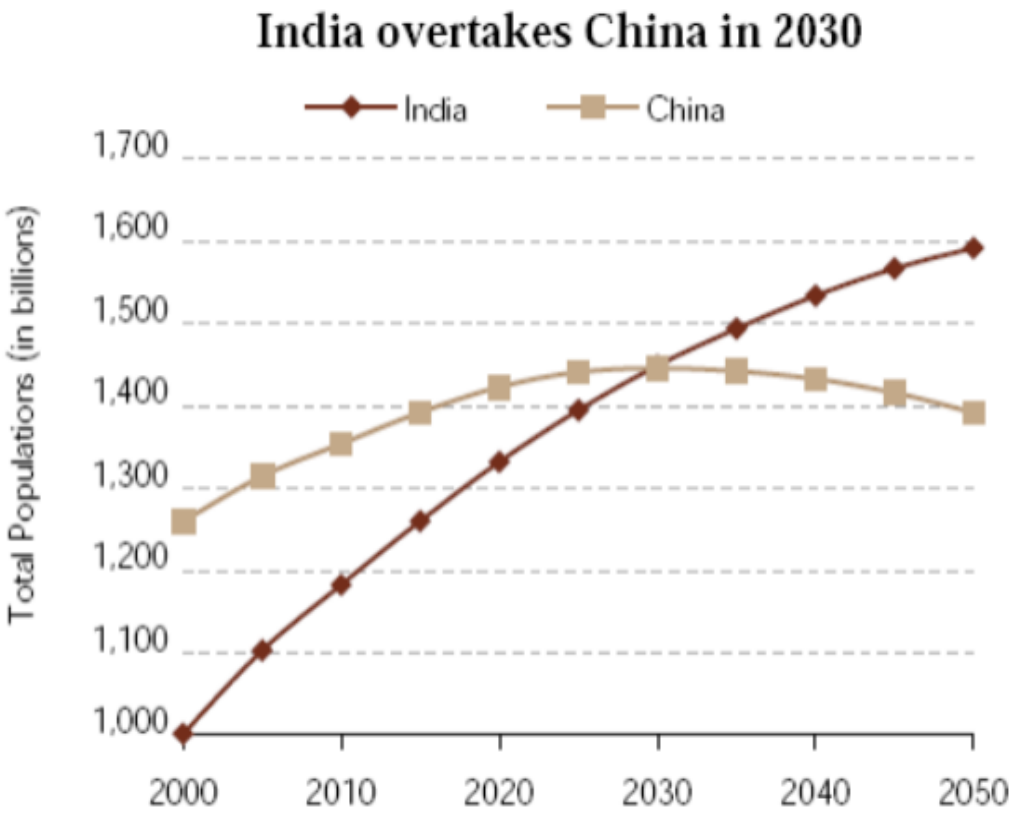
India boom
Health care doom!

- India's booming population, currently 1.1 billion and growing at 2% annual rate
- Rise in diabetes, chronic diseases and life threatening diseases like hypertension, heart disease, cancer etc
- India's healthcare infrastructure: woefully inadequate to meet the increasing healthcare demands.



Source: UN Population Division: Medium variant

How does one get a Dx in India?

Rural population comprises 70% of total population.

90% of secondary and tertiary health care facilities are in cities and towns

A solution: Telemedicine

Web based software

Doctor with
PC and broadband internet

Patient end: PC and hardware to send medical data to doctor

Benefits to Healthcare Professionals

- Providing services to as many patients as possible,
- Extend specialist resources to more locations
- Convenience: Doctor can be located anywhere
- Quick and timely follow up of patients getting discharged

Benefits to Patients

- Easy access to specialized healthcare services by rural, under served, semi urban and in remote areas
- Early diagnosis and quick treatment
- Reduced visits to specialty hospitals
- Reduced travel expenses
- Reduced burden of morbidity

What one needs in a Telemedicine Setup

- ✓ ***High quality video*** which leads to a great patient experience.
- ✓ ***Doctor not restricted to a room***, can be located anywhere with his laptop and internet.
- ✓ Integrated with patient hardware such as ***digital stethoscope, BP, ECG*** etc -much more than just a video conferencing experience.
- ✓ Integrated with a ***teleradiology*** platform enabling Xrays/CT's etc of patient to be transmitted to the treating doctor.
- ✓ ***Works on Low bandwidth (512 kbps), ideal for rural areas***

Older Telemedicine

- ✓ **Video conferencing units**
- ✓ **Satellite connectivity**

Telemedicine of today: Not just a video conferencing unit

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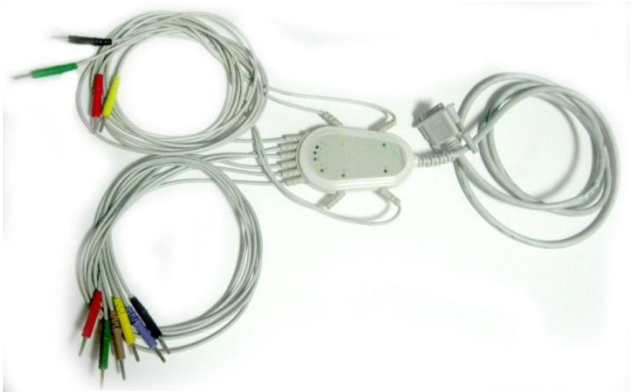
RADSpa™
Teleradiology



Newer Telemedicine

Paramedical staff submits patient data to scheduler.

Doctor sitting remotely gets patients data in queue and history.

Patient and doctor are connected real-time through audio/video of Healthpresence

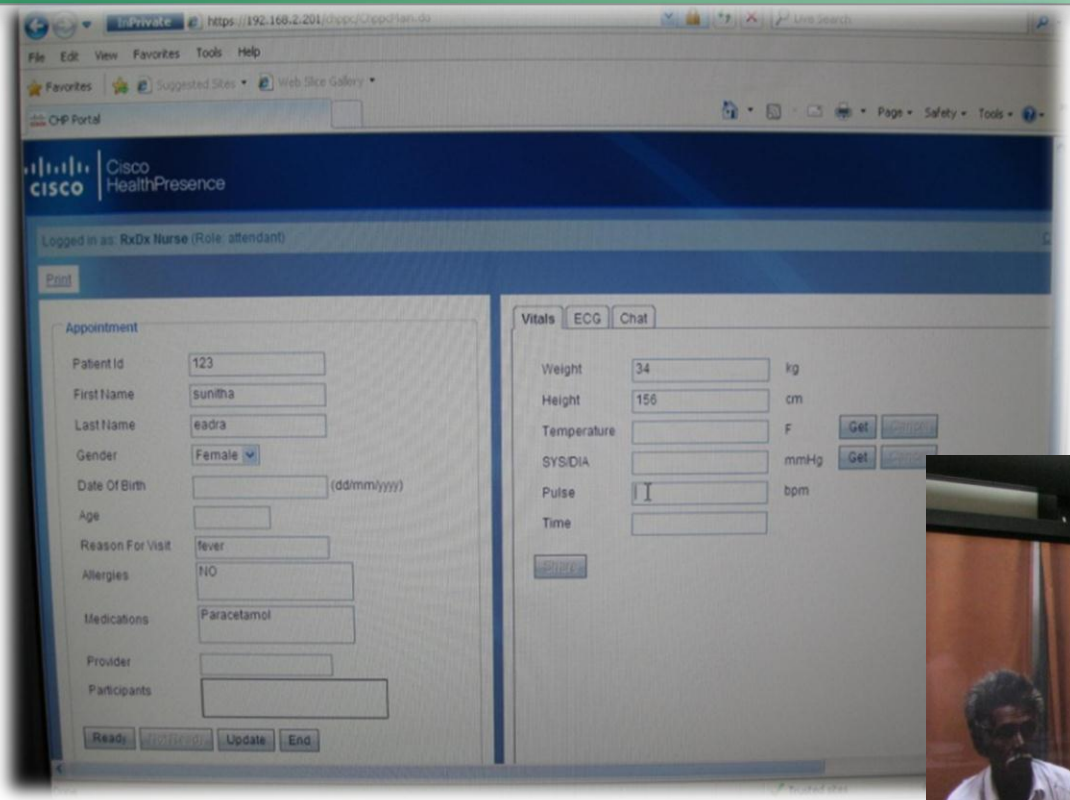
Patient data: BP, HR, ECG, saturation recorded and transmitted to doctor. Doctor can use digital stethoscope to listen to lungs, heart, bowel sounds.

Ideally X-ray or other diagnostic tests can be transmitted via a teleradiology platform

Doctor writes diagnosis and prescription.

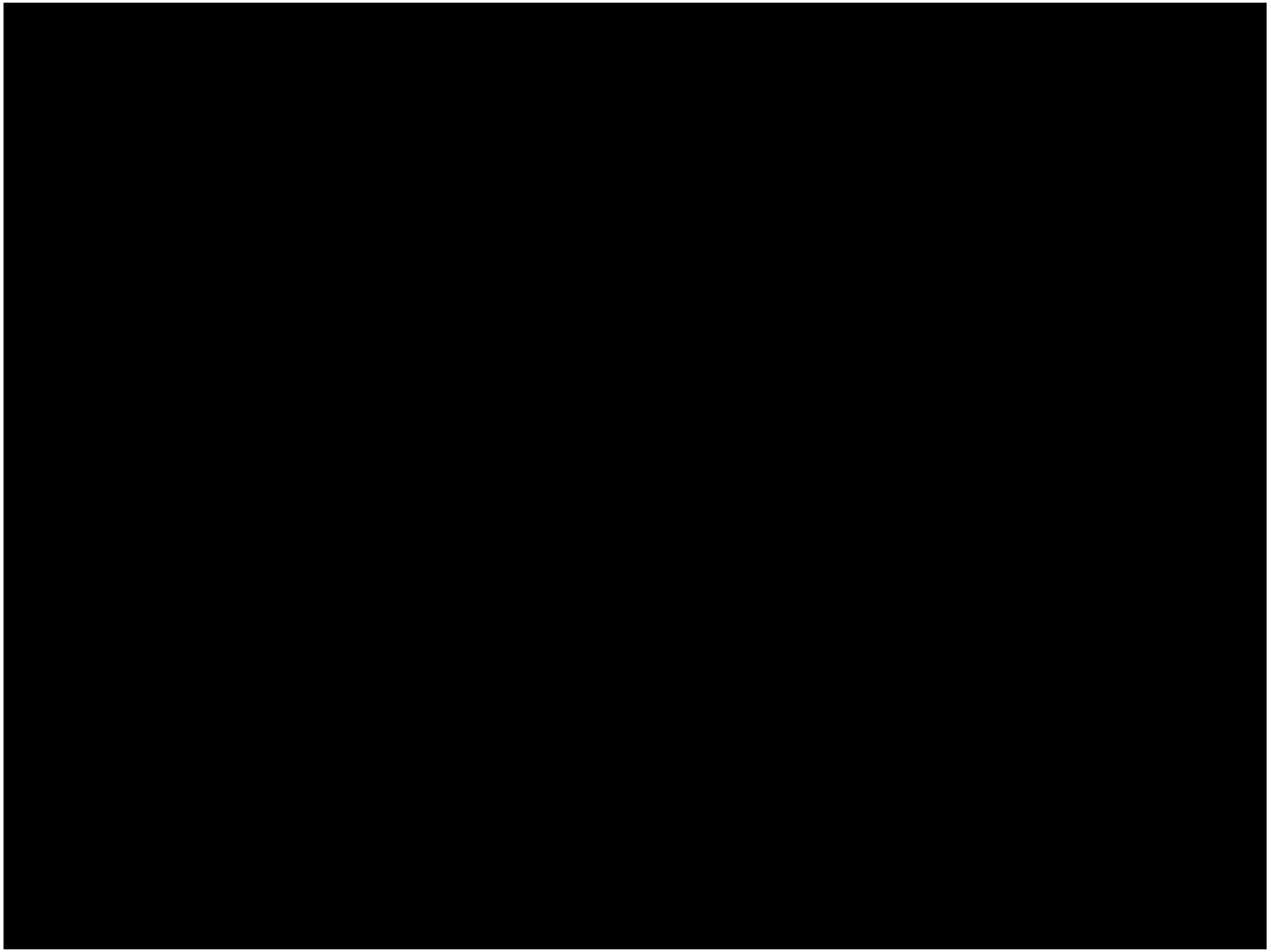
Staff or patient gets the prescription print. Patient consultation data is archived.

Interface snap shots at the Doctor end

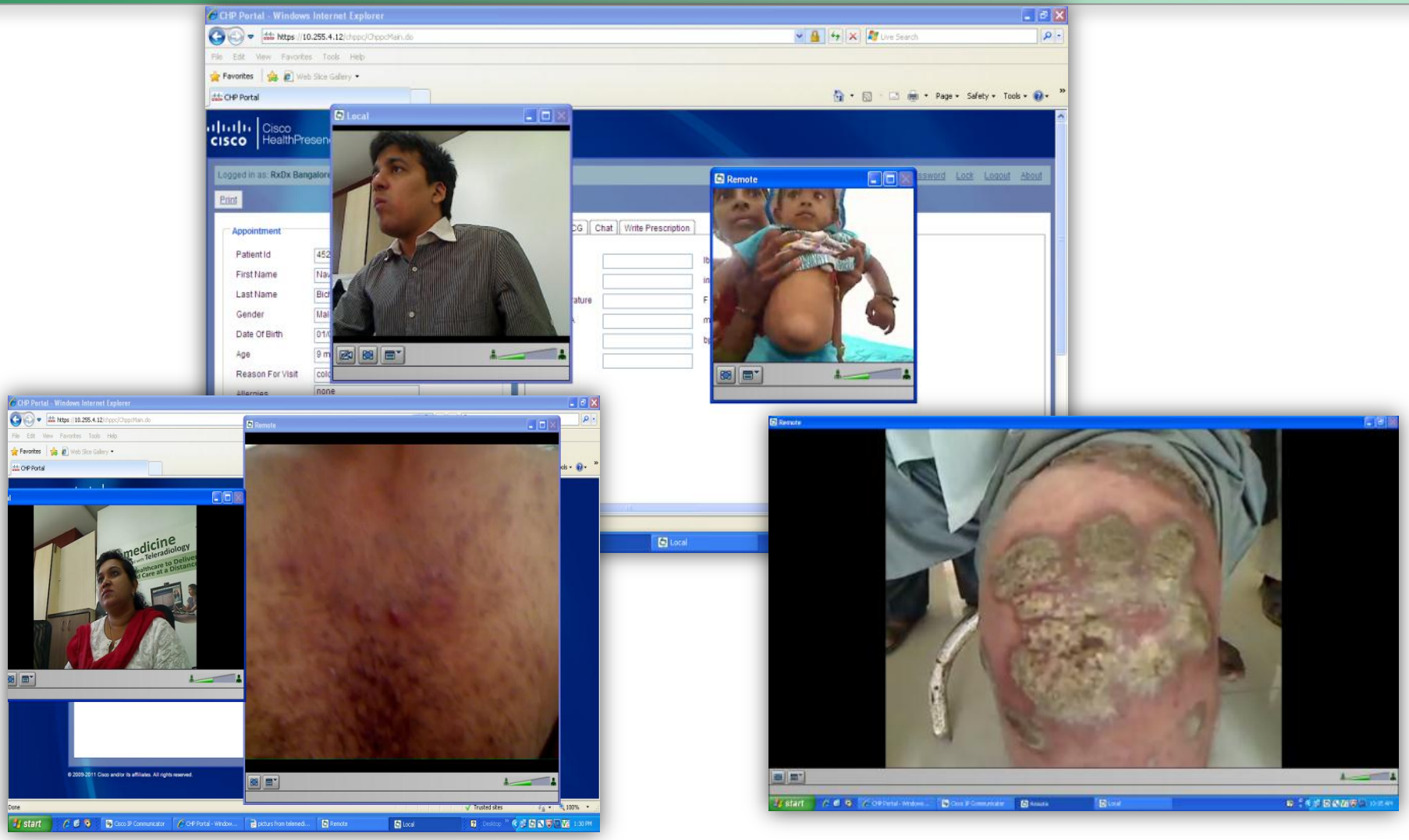


At the Patient Site

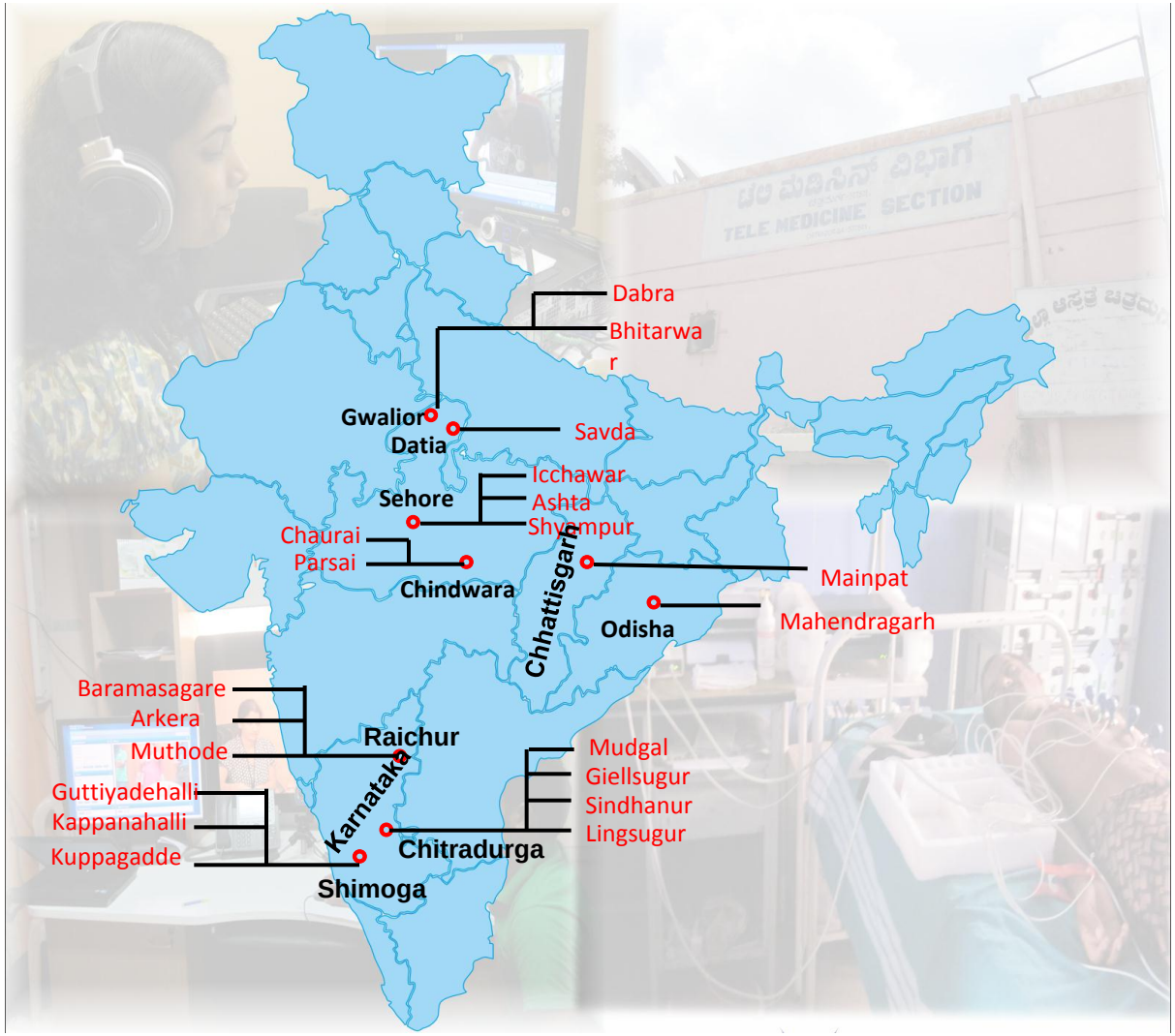
Live Telemedicine Session



Examples of cases that can be helped



Our Experience: Telemedicine for 22 Health Center's in India



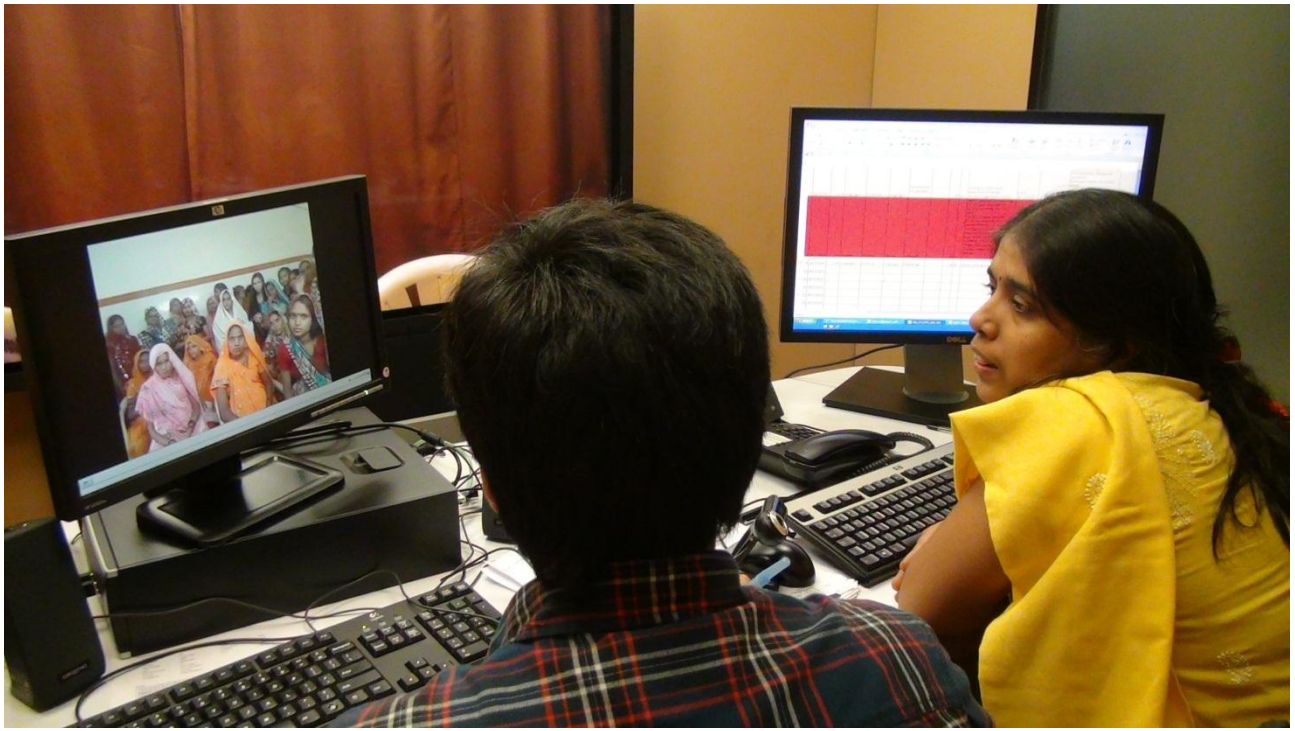
Telemedicine consults

Number of **telemedicine consultations** via **RXDX doctors** using **Cisco's health presence** managed by **Telerad Tech** **from** Jan 2011 **to** Feb 2013: **11500**

Revisit rate: 20%

Doctor comfortable with his diagnosis: 75%

E-teaching: One teacher reaching many



Gynecologist in a teaching session on health and nutrition for pregnant patients from Bhitarwar primary health center in Madhya Pradesh via the telemedicine platform

Telecardiology

- 1 billion people
- 10000 miles from

  Kashmir-Kanyakumari
- Max: 100 Pediatric Cardiologists
- Max: 15 cardiac centers that deal with kids

Africa:

Whole country of Tanzania

Does not have a DM

No diagnosis…no Rx

Pediatric Cardiac disease

Nearest Echo machine maybe 200 kms away

Nearest Pedi Cardiologist maybe 500 kms away

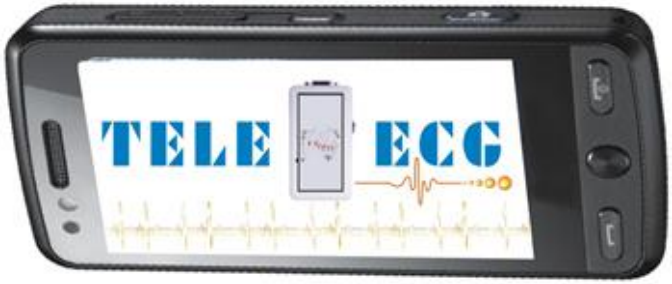
The Answer:

TELE ECG

TELE ECHO

Tele ECG: No longer news

Earlier over phone lines, or scan and email
Now wireless, to smart phone
Makes the cardiologist more accessible



Tele ECG electronic device using mobile cellular network operated with the help of a mobile phone via bluetooth. Records ECG of the subject and displays the same on mobile. ECG can be sent to the experts mobile through multimedia service (MMS) for his opinion

Tele-ECHO

- Trained a tech over 2 months or an internist/pediatrician
- Sent back to home town/remote site
- Tele echo link established
- Pedi Cardiologist available at main site
- Diagnosis made, management discussed
- Patient gets on train!

Ashwini Childrens, Bijapur, North KA

Real time teleecho: Synchronous

Patient end

Doctor end

Disadvantages

- **Since real time cardiologist has to be available at the other end to review**

For a chicken without head cardiologist this maybe difficult

Middle of the night-if cardiologist not at telemedicine center cannot review till am

Store and forward: Asynchronous

Method 2
Link to server
At convenience!

Echo machine to Laptop

Import to
Software on computer

Uploaded to server

Viewed by Pedi cardiologist
Report sent back to the referring doctor/patient

Advantage/*Disadvantages*

- **Web based, Echo can be viewed at any time from anywhere with a basic internet connection**
- **Cardiologist need not be at telemedicine site, can review at home in middle of night**
- ***Echo operator at remote site has to be well trained and experienced***
- ***If further info needed patient needs to be rescanned***
- ***Cardiologist may put off reading till a convenient time i.e. may give reports late!***

Conclusion

- **In a vast country such as India with Cardiac and pediatric cardiac resources limited to major cities, tele echo is a cost effective and do-able way to accurately diagnose heart disease and guide therapeutic decisions.**
- **Overall for telemedicine to be effective, the video experience needs to be good, work at low bandwidth and the platform needs to be integrated with medical devices and teleradiology**

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Thank U!

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