New Tele-Cardiology Service for the Regional Healthcare System in Finland

A Case Study

Ofer Atzmon
Aerotel Medical Systems (Israel)

Med-e-Tel
Luxemburg, 1 April, 2009
Abstract

• We present preliminary results from a tele-cardiology pilot in Finland

• Ease of use, satisfaction and efficiency were evaluated by all stake-holders
  • Doctors
  • Nurses,
  • Administrators
  • Patients
Aerotel Medical Systems

- A leading global supplier of modular, mobile & home based remote monitoring systems
- Providing devices and software for use by telehealth service providers
- Based in Israel, with a client base in 45 countries
- “Patient Monitoring Company of the Year Award 2006” by Frost & Sullivan
- “Innovation and Growth Strategy Leadership of the Year Award 2007” by Frost & Sullivan
- Visit us at Med-e-Tel 2009 - stand 1C48
Applications & Solutions

- Homecare systems
- Chronic care
- Rehabilitation
- Mobile health systems
- Wireless personal alarm systems
- Tele-consultation
Finnish Partners

- **Emtele - Technology and Service Provider**
  - A private service provider of scalable healthcare ICT platforms
  - Connects customer devices to services, enabling enterprises and communities to provide better service with smaller investments
  - Emtele eHealth infrastructure provides a managed connectivity environment for secure and easy to use remote diagnostic services

- **Satakunta Hospital District - Regional Healthcare Provider**
  - A public, municipality-owned, regional healthcare service provider in West Finland operating several regional hospitals and clinics
  - Working with regional basic health services and social services, offers specialized care for 226,000 residents in 24 member municipalities
  - Specialist services are provided at the Central Hospital of Satakunta, with additional regional hospitals and community clinics
  - The hospitals have approximately 612 beds in use
The Solutions Used in the Pilot

- ECG monitoring devices
- ECG receiving software
- Remote access technologies
- Mobile personal computers
- PSTN/mobile phones, Internet Infrastructure
HeartView™

12-Lead ECG Recorder/Transmitter

- User-friendly, ECG transtelephonic recorder/transmitter.
- Transmits 12-lead ECG data from any place and at any time over the phone to the HRS for immediate diagnosis.
Acoustic Transmission of ECG

Taking ECG with HeartView™

Acoustic transmission of ECG via phone
HeartView P-12/8 Plus™

12/8-Lead ECG Personal Recorder/Transmitter
Digital, Bluetooth® & Acoustic

- Small, easy-to-operate, 12 or 8 lead ECG monitor.
- Patient records ECG using 3-wire patient cable and four embedded electrodes.
- Gives physicians a clear, comprehensive 12 lead ECG.
- Recorded ECG is transmitted through phone (fixed or mobile) to the HRS for immediate diagnosis.
HeartLine
Receiving Station (HRS)

Cutting-Edge Technology for Medical Data Acquisition, Disease Management, Diagnostics & Emergency ECG Service Center

- Easy to operate; can be applied to any standard PC equipment.
- Flexible, modular platform (Single station or Network).
- Supports Aerotel's entire line of Heartline monitors.
Heartline Remote Receiver (HRR)

- PC-based solution for tele-cardio-consultation
- Used in a doctor’s office or at home visits
- Local viewing and storage of ECG signals from various devices (1-12 leads)
- Transmission via Internet to Aerotel’s remote monitoring station (HRS) for viewing, storing, printing and interpretation
- Transmission can be real-time or delayed, as needed
HeartView™ Tele-Cardiology System

Home Patient
HeartView P12/8 Personal ECG
Acoustic

Mobile Patient
HeartView P12/8 BT Personal ECG
Cellular

Primary Care Clinic
HeartView 12L Professional ECG
Acoustic
ECG Viewer/Remote Receiver

Cardiac Monitoring Center
Cardiologist on call 24x7
PSTN Modem
Cellular Modem
Heartline Receiving System

Heartline-Net Server
Patient Database
Internet

Remote Access
Specialists
Patients, administrators, etc.

13
The Methodology

- Aerotel HeartView™ hand-held 12-lead ECG recorder/transmitter devices
- Un-manned 24X7 medical call center hosting (HRS) - installed in Helsinki, 240km form the district
- Receiving of ECG signals from clinics and homes
- Nurses doing house calls, equipped with a HeartView™ ECG monitor and a laptop with HRR
- Interpretation of ECGs by expert cardiologists via remote access
- Doctors and nurses received short hands-on training
How the Devices were Used

- HeartView™ recorded the 12-lead ECG and transmitted it from a patient’s home or a primary care clinic
- Transmission was via a laptop PC or a mobile phone
- The ECG was captured at the remote center and displayed on screen - both locally and in regional doctors offices - or printed out
- SSL VPN connection was used
- A reference ECG device was used for control
- Expert cardiologists were able to interpret the results
- Cardiologist did not have to be physically located at the call center, but could access data from anywhere
- During transmission, the cardiologist could be in direct contact with the patient’s doctor or nurse, as needed
Preliminary Results

• The results so far indicate that the devices and software are easy to use, and easy to learn
• After basic training doctors and nurses were able to start working with HRS application and regarded the system as logical and easy to use
• PC application (HRR) was found to be logical and gave the opportunity to archive and send further ECGs in electronic form instead of paper prints
• Each tele-ECG saves one primary healthcare laboratory ECG procedure, plus patient travel time
• Cost savings are estimated to be significant and will be evaluated after the pilot
Satisfaction of Stakeholders

- After gaining experience, nurses were more confident to decide themselves if a patient was in need of an ECG test, without referring to the doctor.
- Doctors needed very little training and regarded the system as very easy and intuitive to use.
- The doctors were satisfied with the quality of ECG signals received and with easy-to-use features and decision-support.
- They appreciated the remote access to application regardless of place/time.
- The medical directors were satisfied with the quality and efficiency of the service.
- Administrators liked that quality diagnostics can be served to citizens even at the first care level by existing stuff at an affordable cost and little investment.
- Patients were very please by not having to travel distances to take their ECG and not having to waste time and money on taxi trips.
Conclusions

• The pilot addressed the use of telemedicine equipment for undertaking cardiovascular diagnosis and monitoring for patients with cardiac conditions within the home/community environment.

• Digital technology based devices together with ICT systems enable new ways of performing medical diagnostics.

• Compact size, easy-to-use devices produce premium quality diagnostic information at a very attractive cost level.

• With this technology, existing processes can be re-engineered resulting in shorter delays, more accurate diagnoses and lower costs.

• ECG data can be stored in a standard format (SCP) and can be interoperated across different healthcare platforms, including existing and new electronic health record (EHR) systems.