Integrating a mobile health setup in a chronic disease management network

Hang Ding, Derek, Ireland, Rajiv Jayasena, Jamie Curmi, and Mohan Karunanithi. 
Presenter: Hang Ding (hang.ding@csiro.au)
Background

- Over 7 million people (30% of population) live with at least one chronic disease condition.
- Chronic disease accounts for 70% ($AU 34 billion) of overall disease expenditure.
- Supporting self-management of chronic disease has been identified as a national priority under the National Chronic Disease Strategy (2005).
- Uptake of disease management programs and compliance with clinical guidelines are poor.
- Barriers: Time constraints due to work commitments, lack of self-management tools, and lack of clinical supports.
Objectives

• To integrate a mobile health platform with an established national chronic disease management network, called cdmNet.
• Patients can use ubiquitous smart mobile phones to upload health data.
• Health professionals can review patients’ day-to-day health data to support the self-management of chronic disease.
Mobile Health Web Server (HTTPS)

- Automated Configuration
- Bluetooth Data Port
- Data Repository
- Data Export (RESTful)
- Mobile Web User Interface

Transport Layer Security

cdmNet

https:

3G/4G/WiFi

HTTP with TLS

Mobile Apps

Mobile Web UI

Users

Health Professionals
User Interfaces of the mobile website
Advantages of mobile web applications

• Compatibility.
  • Can be assessed by many different types of mobile devices.

• Upgradability.
  • Mobile websites can be updated instantly.

• Lower cost.
  • Development of mobile websites is quicker and less expensive.
User Interfaces of the mobile app

Date: 14 Dec 2012
Time: 14:54

Glucose: 7.1 mmol/L
Temp: 25.0 °C

Status
Uploaded, thanks.

Exit Setting

Date: 14 Dec 2012
Time: 16:43

BP: 107/69mmHg.
Heart: 81 BPM

Status
Uploaded, thanks.

Exit Setting
Advantages of mobile applications

• Fast and responsive.
  • Is not limited by Internet speed.

• Wireless connectivity.
  • Wireless connectivity to simply data collection and improve usability for applications requiring frequent measurement.

• Inbuilt sensors.
  • Motion sensors can be used to measure physical activity.
Potential benefits of the integration

- Improve uptake and adherence of self-management.
  - Fit lifestyles.
  - Portable and easy to use.
- Accommodate a large population.
  - Ubiquitous.
  - Remote monitoring for telehealth.
- Timely clinical diagnosis and intervention
  - Real-time data collection.
  - Longitudinal data for assessing of disease progression.
  - Shared health data for collaborative care.
- Improved data quality
  - Wireless data collection.
  - Digitized and centralized data.
  - Exportable and reusable for research.
Current Status

- Web application.
  - Validated through the W3C mobileOK checker.
  - Tested models: iPhone 4, Android phone (HTC), and Symbian Nokia N95.
- Android App
  - Benchmark test on the Bluetooth connectivity to transfer measures of blood pressure and glucose from BT enabled devices (FORA D40) to Android phones.
  - Tested phone models: Sony X10, HTC Desire X.
- Project completed
  - Prove the feasibility of the conceptual framework.
  - Setup an integrated mobile health platform, ready and expandable for clinical trials.
Future work

• Clinical trials
  • To evaluate the uptake and adherence through the mobile health integrated system.

• Innovative applications
  • New care models for self-management of heart failure, diabetes, and COPD.
  • New models of aged care for independent living.
  • New clinical platforms for assessing Parkinson’s disease and psychological disorders.

• Mobile Health Enabled Cardiac Rehabilitation.
  • Mobile UIs for patients.
  • Export to Viewer of Queensland Health.
  • Clinical Portal.
Summary

• Current Issues
  • Prevalence of chronic disease.
  • Burden to health care system.
  • Need for clinical support of self-management.

• Solution
  • Integrate a mobile health solution with an already implemented IT solution for chronic disease management.
  • Patients can use ubiquitous smart mobile phones to upload health data.
  • Health professionals can review patients’ day-to-day health data for disease management.

• Future
  • Clinical validations.
  • Innovative clinical care models and applications.
Thank you

Dr. Rajiv Jayasena
Dr. Mohan Karunanithi
Mr. Derek, Ireland

Prof. Michael Georgeff
Mr. Jamie Curmi

Contact Us
Phone: 1300 363 400 or +61 3 9545 2176
Email: enquiries@csiro.au  Web: www.csiro.au