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Opportunities and Barriers for M-Health in New Zealand

BY

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners. I understand that my thesis may be made electronically available to the public.


F. B. Mirza
26/Sep/2007

Abstract

This thesis describes a study to determine the opportunities and barriers for mobile health in New Zealand.

The world total of mobile phones currently stands at 2.5 billion and is set to reach 3 billion by the end of 2007 [1]. New Zealand has approximately 3.8 million mobile subscribers [2],[3] and this country, along with many others, recognizes the opportunities for using mobile technology in healthcare. Mobile health (m-health) has moved past the hype stage overseas; there is good evidence for improved productivity, and growing evidence for improved patient engagement. Broadband wireless, improved mobile devices and integrated mobile applications will continue this growth. New Zealand health and disability providers can adapt these overseas m-health successes to develop their own mobile health strategies [4].

M-health involves the use of mobile technology to enhance health services. The mobile technology can be either a short-distance or long-distance technology, or be device driven. The health industry is an information intensive industry, and as New Zealand has a public healthcare model, the idea of information integration among and within health sectors is encouraged.

The purpose of this study is to identify the barriers and opportunities of m-health in New Zealand. Following an introduction, the literature survey defines the scope of the study. It first discusses wireless and mobile computing technologies, then looks at New Zealand healthcare information strategies and the importance of information in the health industry. Finally, these two topics are investigated by exploring the literature on the use of wireless technology in healthcare — in both clinical and non-clinical applications.

M-health is a new area of development in the health industry. Hence the practical part of the research used a qualitative research strategy, determined to be appropriate to obtaining a better understanding of any phenomena about which little is yet known [5]. The two main parts of this research include the questionnaire and the interviews. The questionnaire sample was selected from health users, health planners, health technology suppliers, and academics, and covered areas of patient care, primary care, secondary care, community care, and integrated care.

The interview sample consisted of technology strategists, primary healthcare planners, secondary healthcare planners, and community healthcare planners. The main focus of the interview was to find out about the future of m-health in New Zealand, analyze which sectors can benefit from m-health, examine the opportunity for customized software on mobile devices, gather possibilities of mobile assistance toward integrated care, and lastly, find out about the privacy and security issues of using mobile technology in healthcare.

The questionnaire results indicate that the patients would appreciate receiving health services on their mobile phones. There is strong agreement that patients will benefit from text reminders, health awareness campaigns, and patient monitoring. The findings indicate that community nurses could use m-health technology to improve integration of information. There are two differing opinions on Electronic Health Records (EHRs) and their mobility across all sectors — the technology strategists think it is very important, but the health planners are divided.

The opportunities that have been identified from the interviews include monitoring, health alarms, patient engagement in healthcare, community workers information integration, SMS reminders and alerts, ability of health workers to work offsite, prescription feedback, and

using PDAs where necessary to enable electronic data capture. The barriers include legacy systems, disparate systems, lack of standards, lack of integration tools, lack of bandwidth, DHB-led initiatives, older health planners who are resistant to technology, ill population having the least uptake of technology, inability to share information with patients, development of mobile applications, infrastructure investment, telecommunication barriers, changed management, lack of technical capabilities, and cultural barriers.

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Allahu-Akbar (God is the greatest)

Farhaanullah Baig Mirza

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Table of Abbreviations

| | |
|-----------|-------------------------------------------------|
| 1xRTT | 1 times Radio Transmission Technology |
| 3GPP | Third-Generation Partnership Project |
| A&E | Accident and Emergency |
| ABx guide | Antibiotic Guide |
| AMPS | Advanced Mobile Phone System |
| BAN | Body Area Network |
| BCU | Body Central Unit |
| BMIS-T | Battlefield Medical Information System-Tactical |
| BSU | Body Sensor Units |
| CAT-Scans | Computed Axial Tomography Scans |
| CDMA | Code Division Multiple Access |
| CDPD | Cellular Digital Packet Data |
| CEO | Chief Executive Officer |
| CFO | Chief Financial Officer |
| CIO | Chief Information Officer |
| CMC | Centre for Mobile Computing |
| CPE | Customer Premise Equipment |
| CSD | Circuit Switched Data |
| D-AMPS | Digital Advanced Mobile Phone System |
| DHB | District Health Board |
| DNA | Did Not Attend |
| EDGE | Enhanced Data rates for GSM Evolution |
| EHR | Electronic Health Record |
| EMR | Electronic Medical Record |

| | |
|----------|-------------------------------------------|
| ePOC | Electronic Point-of-Care |
| FDMA | Frequency Division Multiple Access |
| FOMA | Freedom of Mobile Multimedia Access |
| GAN | Generic Access Network |
| GDP | Gross Domestic Product |
| GPRS | General Packet Radio Service |
| GPs | General Practitioners |
| GSM | Global System for Mobile Communications |
| HINZ | Health Informatics New Zealand |
| HISO | Health Information Standards Organization |
| HPI | Health Practitioner Index |
| HSCSD | High-Speed Circuit-Switched Data |
| HSDPA | High-Speed Downlink Packet Access |
| HSOPA | High Speed OFDM Packet Access |
| HSUPA | High-Speed Uplink Packet Access |
| ICT | Information and Communications Technology |
| iDEN | Integrated Digital Enhanced Network |
| IP | Internet Protocol |
| IrDA | Infrared Data Association |
| IS-95 | Interim Standard 95 |
| ISP | Internet Service Provider |
| IT | Information Technology |
| MDRTB | Multiple Drug Resistant Tuberculosis |
| M-Health | Mobile Health |
| MMS | Multimedia Messaging Service |

| | |
|------------|---------------------------------------------------------|
| NHI Number | National Health Index Number |
| NHS | National Health Service |
| NMT | Nordic Mobile Telephone |
| OEM | Original Equipment Manufacturer |
| PC | Personal Computer |
| PDA | Personal Digital Assistant |
| PDC | Personal Digital Cellular |
| PDR | Physicians' Desk Reference |
| PHO | Primary Health Organization |
| PHS | Personal Handy-phone System |
| qID | Latin word that means: Seen on a prescription |
| RFID | Radio Frequency Identification |
| SMS | Short Messaging Service |
| TDMA | Time Division Multiple Access |
| TD-SCDMA | Time Division-Synchronous Code Division Multiple Access |
| UMA | Unlicensed Mobile Access |
| UMTS | Universal Mobile Telecommunications System |
| VPN | Virtual Private Network |
| WAP | Wireless Application Protocol |
| WiDEN | Wideband Integrated Dispatch Enhanced Network |
| WiFi | Wireless Fidelity |
| WLAN | Wireless Local Area Network |
| XML | Extensible Markup Language |