13

MOBILE HEALTH INFORMATION SYSTEM: A MOBILE APP. TO AID HEALTH WORKERS RELATE HEALTH INFORMATION.

PRINCE ANA AND STEVEN CHIBUZOR HUMPHERY

ABSTRACT

Healthcare is conventionally regarded as an important determinant in promoting the general health and wellbeing of peoples around the world. And in doing this, health education and information plays a major role, because it is a reliable medium and the most effective way to reduce morbidity and mortality in developing countries. We need to deliver vital messages and information to people at the lower quarter of the society, this information can be used for changing behaviors' and practices, and this in turn can save and protect lives. It is in this context that the use of mobile phones in delivering vital health information and effective fieldwork reporting is of significance. This project seeks to use the availability of mobile service across the urban and rural areas to benefit healthcare.

KEY WORDS: Health Information System; Mobile Health Information System, Medical Information

INTRODUCTION

BACKGROUND OF THE STUDY

Services such as, the diagnosis, treatment, and prevention of diseases, illness, injury, and other physical and mental impairments in humans is known as healthcare. Researchers observed that most people in urban areas lack better understanding or knowledge of the word "health" let alone those living in the rural areas. Reports from the field do not get to the right quarters for proper decision making and intervention properly addressed.

The act of rendering these services to the right people most times are difficult or impossible. Health information dissemination is done by fliers, billboards, adverts and news (both radio and TV) most people do not get these fliers nor read the billboards. This is because; the fliers printed usually are not enough. Power failure is another big threat because at the time the health information is being announced there will be power outage thus; the information does not get to the desired audience.

It is predicted that mobile technology will have a big impact in healthcare, especially in developing countries. Mobile technology could play a large role in detecting, mapping and responding to epidemics. The motivation behind the development of the mobile technology field arises from two factors. On the one hand, there are high population growths, a high burden of disease prevalence, low health care workforce, large numbers of rural inhabitants, and limited financial resources to support healthcare infrastructure and health information systems. On the other hand is the recent rapid rise in mobile phone penetration in developing countries to large segments of the healthcare workforce, as well as the population.

Worldwide, cellular technologies have demonstrated the incredible power of communication as an agent for social change. Mobile phones promise to benefit people in remote areas by making it easier and cheaper to diagnose diseases such as malaria and tuberculosis.5

Technology has taken healthcare a long way forward now people are more aware about their health status and health needs. However, this development has not fully benefited the lower crest of the society. The reality is that we live in a world where there is a silent emergency every day. It is in this scenario that the opportunity to use mobile phones in healthcare industry for effective reporting and dissemination of health information is of significance.

Health care is conventionally regarded as an important determinant in promoting the general health and wellbeing of peoples around the world. An example of this is the worldwide eradication of smallpox in 1980 - declared by the World Health Organization (WHO) as the first disease in human history to be completely eliminated by deliberate health care interventions.

Health care systems are organizations established to meet the health needs of target populations. Their exact configuration varies from country to country. In some countries and jurisdictions, health care planning is distributed among market participants, whereas in others planning is made more centrally among governments or other coordinating bodies. In all cases, according to the World Health Organization (WHO), a well-functioning health care system requires a robust financing mechanism; a well-trained and adequately-paid workforce; reliable information on which to base decisions and policies; and well maintained facilities and logistics to deliver quality medicines and technologies. In a seminar report of an exploration by an expert committee, the institute of medical literature review did not reveal any substantive evidence of the strengths of paper records. They organized their weakness under four categories, 1 content, 2 formats 3. Retrieval 4. Linkages and integration.

Prince Ana, Department of Computer Science, Cross River University of Technology   Calabar, Nigeria

Steven Chibuzor Humphery, Department of Computer Science, Cross River University of Technology   Calabar, Nigeria

Over the years, the mobile phone subscription of developing countries has steadily increased compared to that in the developed countries. Statistics from the International Telecommunication Union (2007) suggested that there are now more mobile phone users in the developing world than in the developed world. In countries like Uganda, it is estimated that, their mobile phone subscriptions have increased by 1700 percent between 2002 and 2008; the mobile phone subscriptions per 100 inhabitants in 2002 was 1.51, and that of 2008 was 38.4 For Nigeria for the same period it was 1.2 in 2002 and 5.1 in 2010(ITU, 2012). From the above it can be seen that the rate of mobile penetration in Nigeria is very high which makes it a very good platform to use in disseminating of medical information. Reaching large population in remote areas was unthinkable in olden days, with mobile communications revolution sweeping across the globe, nearly 90 per cent of the world's population now has access to a mobile-phone signal, including 80 per cent of people in rural areas.

Mobile-cellular penetration in developed countries has reached saturation levels, recording penetration rates of over 100 per cent and a growth of only one per cent during the past year; in developing countries by contrast, growth in mobile subscriptions is still buoyant, at 20 per cent, with no sign of a slowdown


*Estimates
Source: ITU World Telecommunication /ICT Indicators database
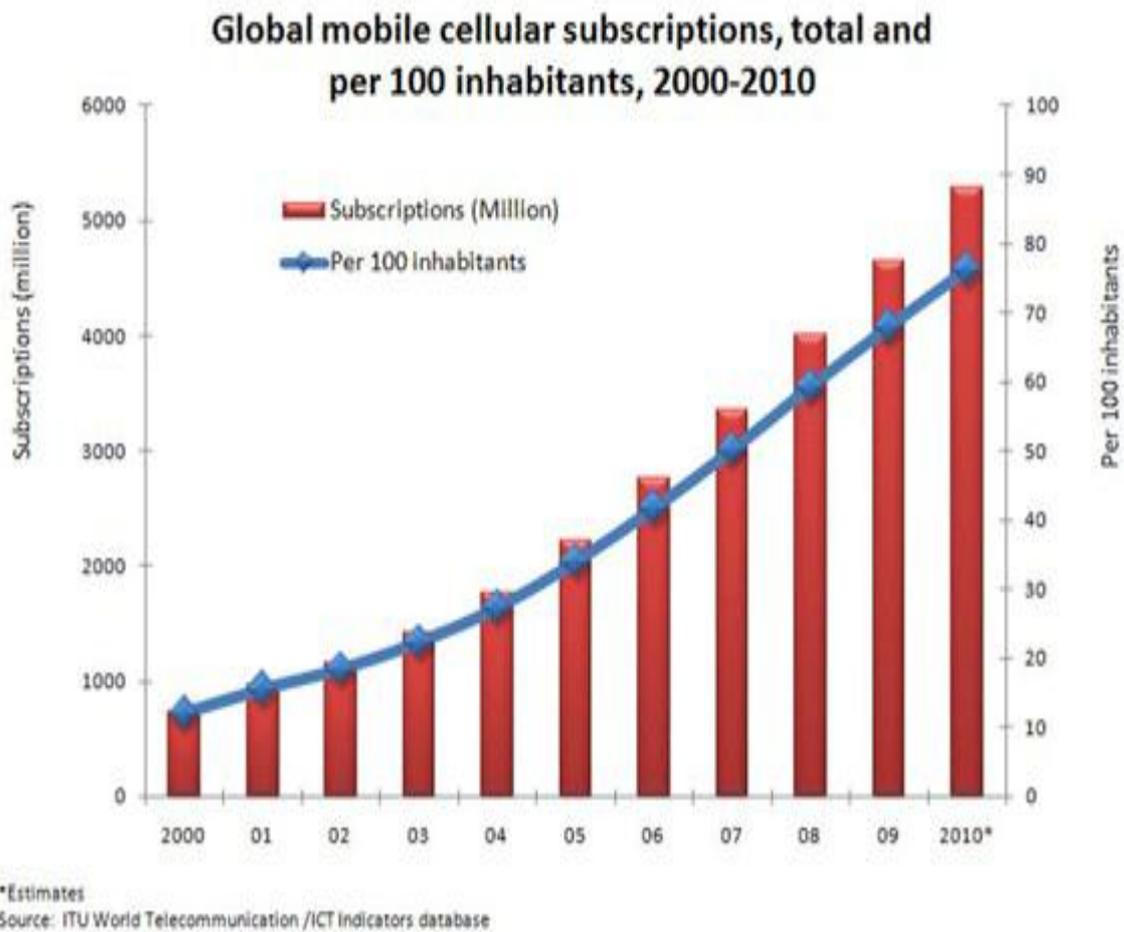
**Fig 1: Global cellular subscription over years**
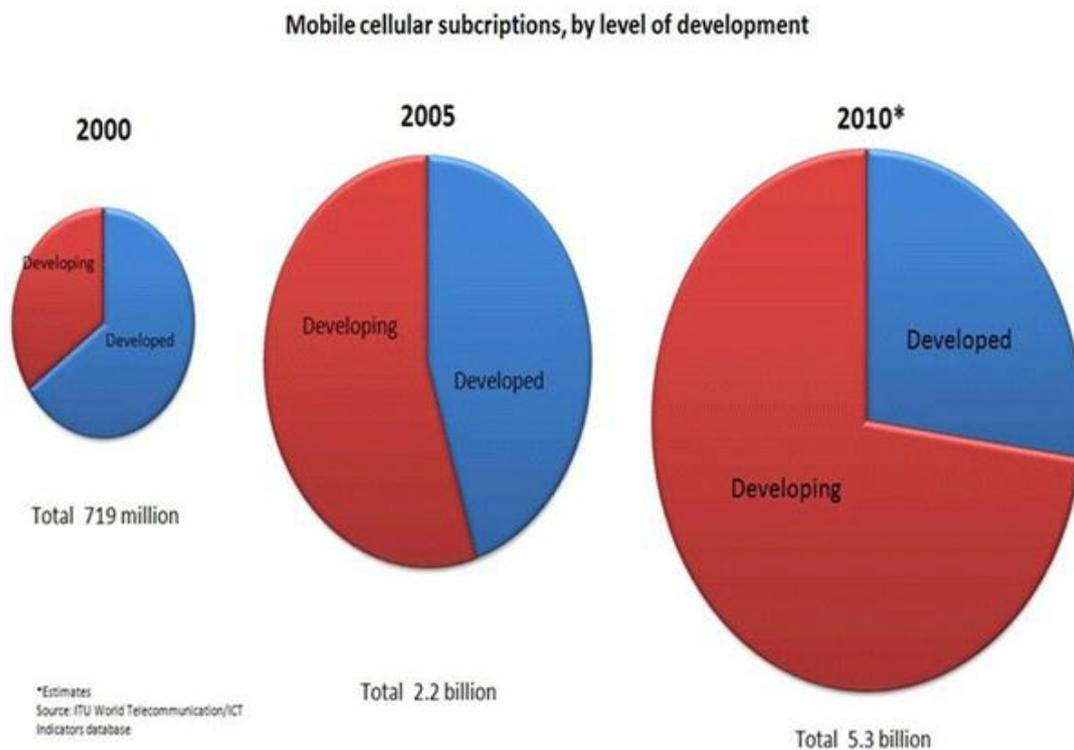
Fig 2: Mobile subscription comparison between developed and developing countries

In Malawi, Josh Nesbit of Medic Mobile developed software that allowed health workers to text in medical information for rural patients. Rather than spend hours commuting to clinics, they could get quick diagnosis on routine symptoms and suggested treatments. According to him, "within six months of the system going live, the number of patients being treated for tuberculosis doubled, more than 1200 hours in travel time were eliminated, and emergency services became available in the area for the first time

PROBLEM STATEMENTS

The significant part of any Health Information System involves the acquisition, management and timely retrieval of great volumes of information and information dissemination. And because of the nature of the existing system (paper based), the following setbacks are faced;

- Mismanagement of data.
- Primary health centers lack appropriate health information update.
- Inability to gather accurate health inventory control at a given time (E.g. how many children were immunized in Abi LGA in August, 2011).
- Lack of proper information passage on disease outbreak.
- No proper accountability on the distribution of healthcare facilities (E.g. mosquitoes' nets).

AIMS AND OBJECTIVES

The aim of this system is to achieve the best possible support of patient care, outcomes, and administration by presenting data when needed and acquiring data when generated with networked electronic data processing.
The proposed system will increase staff productivity and efficiency by:

- Ensuring data integrity and provide a database for future statistical and management reporting
- Reducing the time spent by staff filling out forms, freeing resources for more critical tasks
- The proposed system will also help serve as a mediator between the headquarters and the other branches through the use of phone. It also serves as an inventory control where statistics about a particular illness is known.

Generally, Mobile Health Information System (MHIS) is built to help manage, control, and store health information, and at the same time help the health workers on field work to pass accurate and timely report to the necessary quarters.

SIGNIFICANCE OF THE DESIGN

This design will serve as a base for future designs that will be a source of information and guide to future designers that may embark on similar studies.

The result of this design will aid healthcare organizations enhance team work, collaboration and knowledge sharing among the employees through an integrated communication system. It will significantly reduce paperwork involved with submitting data, documents, reports etc.

Increase effectiveness and productivity through an open communication system which provides for rapid information sharing, proposals and feedback. Ensure smooth workflow through enhanced information dissemination.

SCOPE OF THE DESIGN

This work is restricted to the building of a "Mobile Health Information System using Mobile Phones to relate Health Information". Therefore, this system is designed mainly for use by health care organizations. With this, the extent to which this study goes is restricted to the use of technologies such as J2ME, MIDlets, PHP, and MySQL, that is web-based data management technologies for building.

EXISTING SYSTEM MODEL

The existing system is a manual based system. Information dissemination is done with the use of posters, fliers and mass media. Below is a picture of what it looks like.
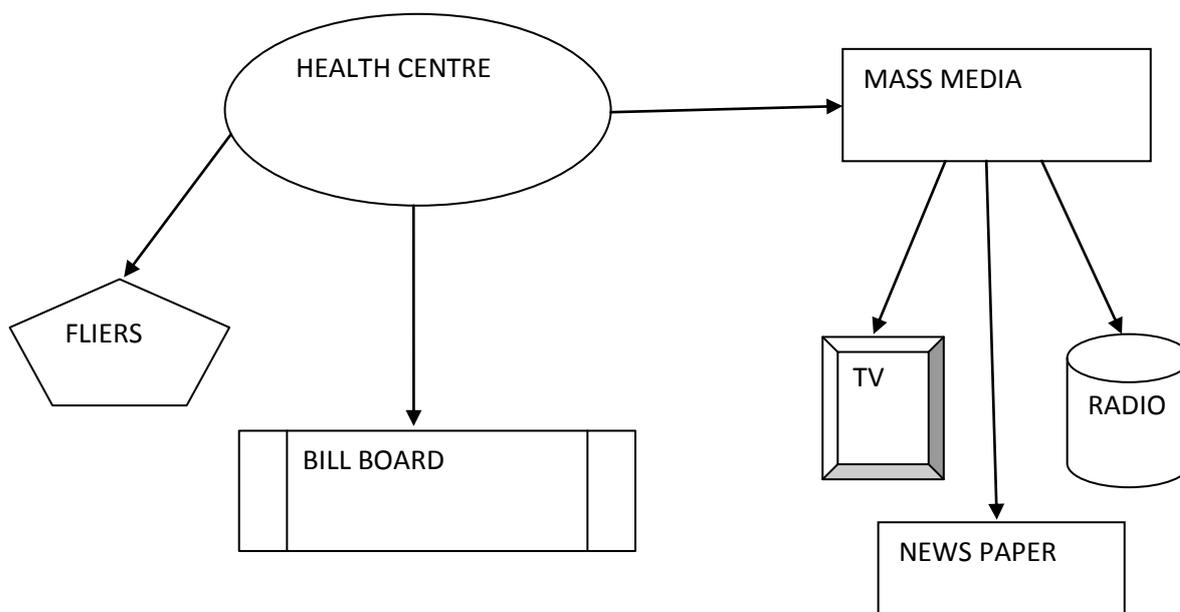
Fig 3.2: Existing System Design

PROPOSED SYSTEM DESIGN

The Design of the new system involves specification of various components that will be used in building the system, defining the attribute of the components and the relationship that exist between these components. The design is broken into:

a. Logical design: - This involves the design of prototypes representing what the actual components of the system will look like. The logical design describes what the user interface; command structure and data store will look like, it is based on these designs that the system is implemented.

b. Physical designs: This aspect of designing has to do with the physical implementation of the logical design through the use of a programming/scripting language. Hence the physical design is the actual construction of the system.
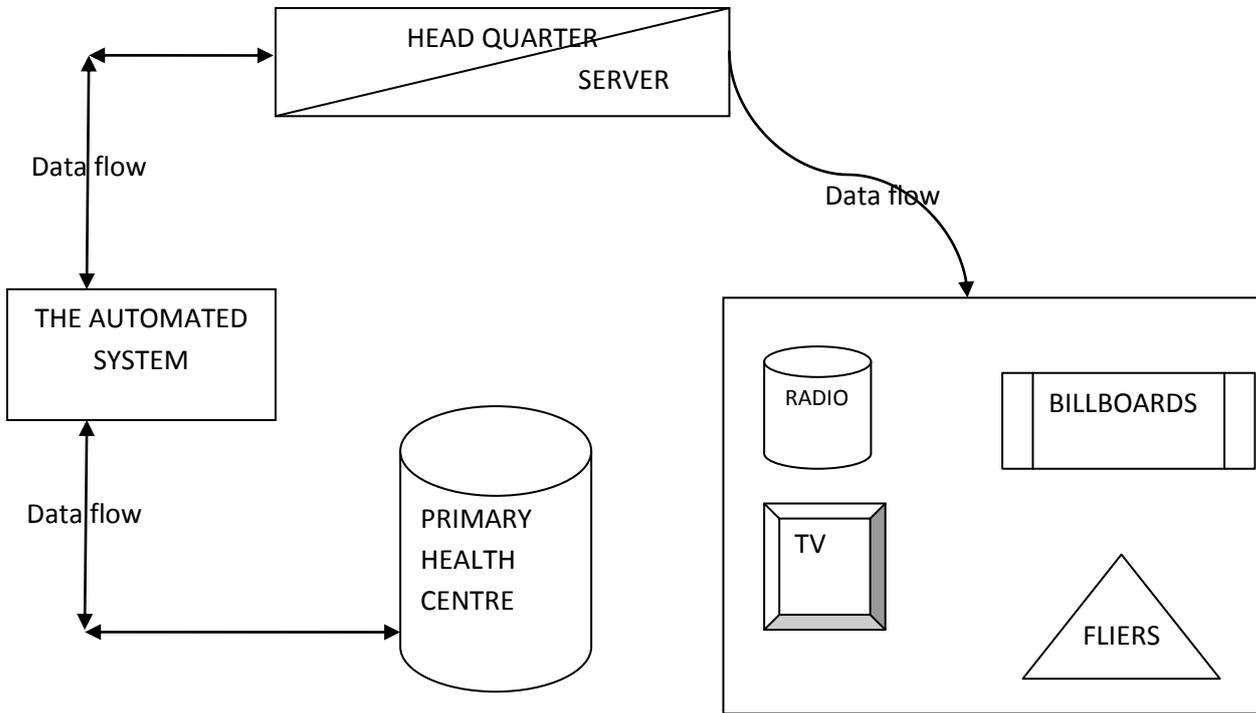

Fig. 3.3: Proposed System Model

HOW THE SYSTEM WORKS

This system is in two phases, the server application and the mobile application. The first application which is the server application is built with Dreamweaver, PHP, MySQL and the second; the mobile phone application is built with J2ME, MIDlets, and PHP. The purpose of building these two applications is to enable them interface and share information with each other. And with the help of a gateway SMS is used to aid quick reporting.

This act involves both retrieval of data and dissemination of health information to the public through the mobile phone. This is made possible because since the introduction of mobile phones, there has been a tremendous increase in mobile phone diffusion in developing countries. Statistics from the International Telecommunication Union (2007) suggested that there are now more mobile phone users in the developing world than in the developed world. In countries like Uganda, it is estimated that, their mobile phone subscriptions have increased by 1700 percent between 2002 and 2008; the mobile phone subscriptions per 100 inhabitants in 2002 was 1.51, and that of 2008 was 27.2 (ITU, 2008).
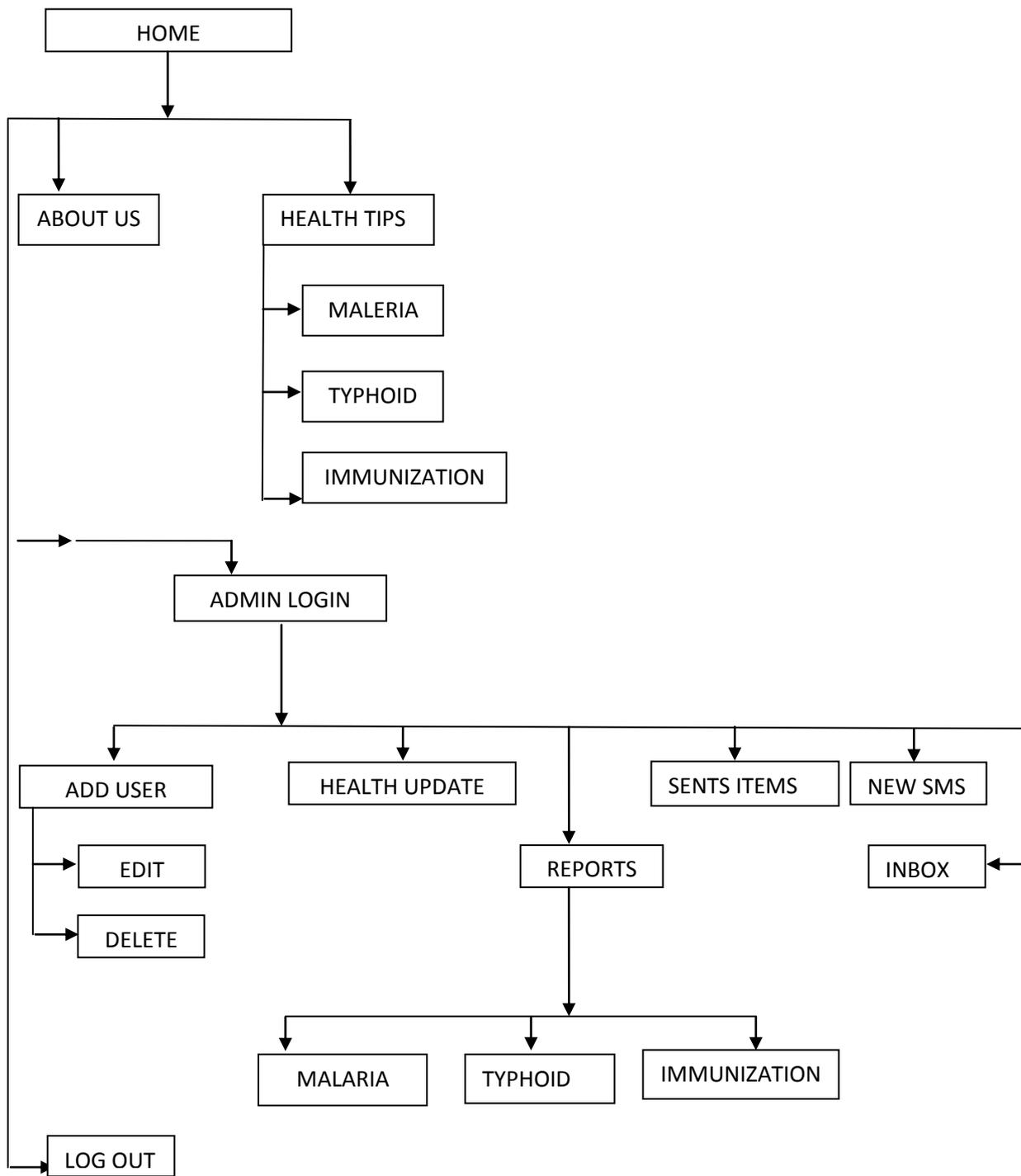
Fig. 3.3: Functional Flow Diagram

SUMMARY

Mobile technology is having a big impact in health care, especially in developing countries and soon will play a large role in detecting, mapping and responding to epidemics in the developing world. Technology has taken healthcare a long way forward, people are more aware of their health status and health needs but this development has not fully benefited the lower crest of the society where silent emergency occure every day. It is in this scenario that the possibility of using mobile phones in health care for dissemination and access of health information is of significance.

CONCLUSION

Worldwide, mobile technologies have demonstrated the incredible power of communication as an agent for social change. The use of mobile phones to disseminate information on health will promote health consciousness to people in remote areas and also serve as an inventory control system for health commodities..

SCREEN SHOTS OF THE APPLICATIONS

HOME PAGE

HEALTHTIPS

OUTPUT PAGE

MALARIA LINK

ADMIN PAGE

SEND SMS PAGE

SENT ITEMS

THE MOBILE APPLICATION
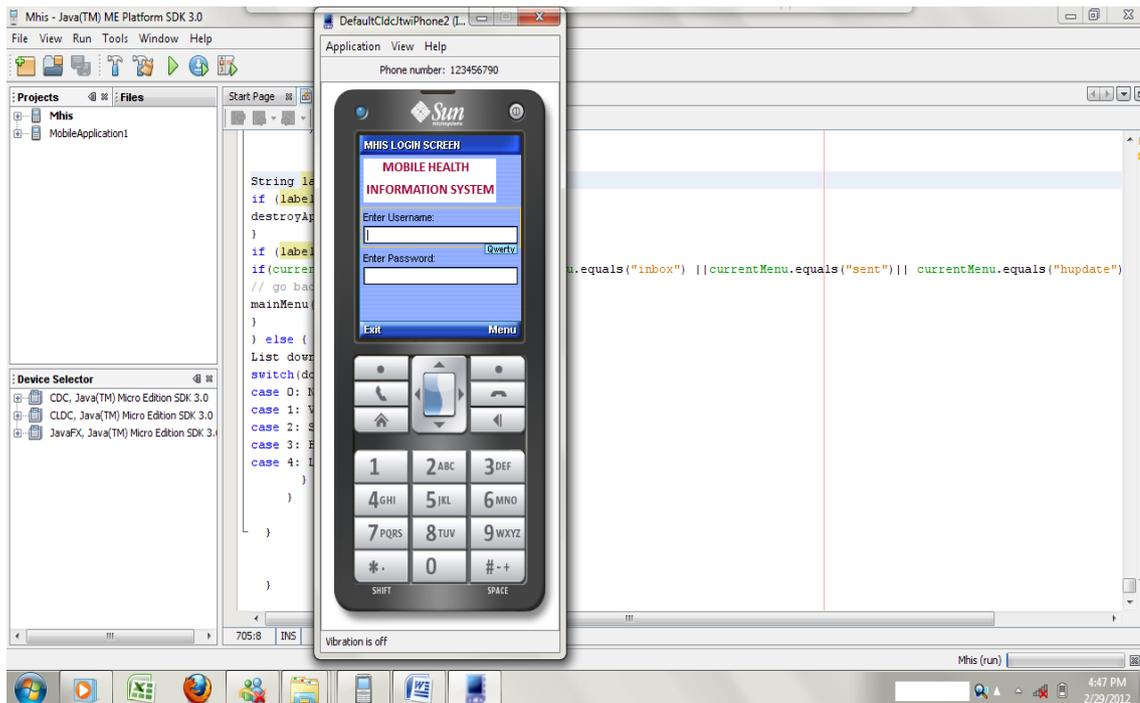
SENT ITEMS FROM FIELD WORK (PHONE)
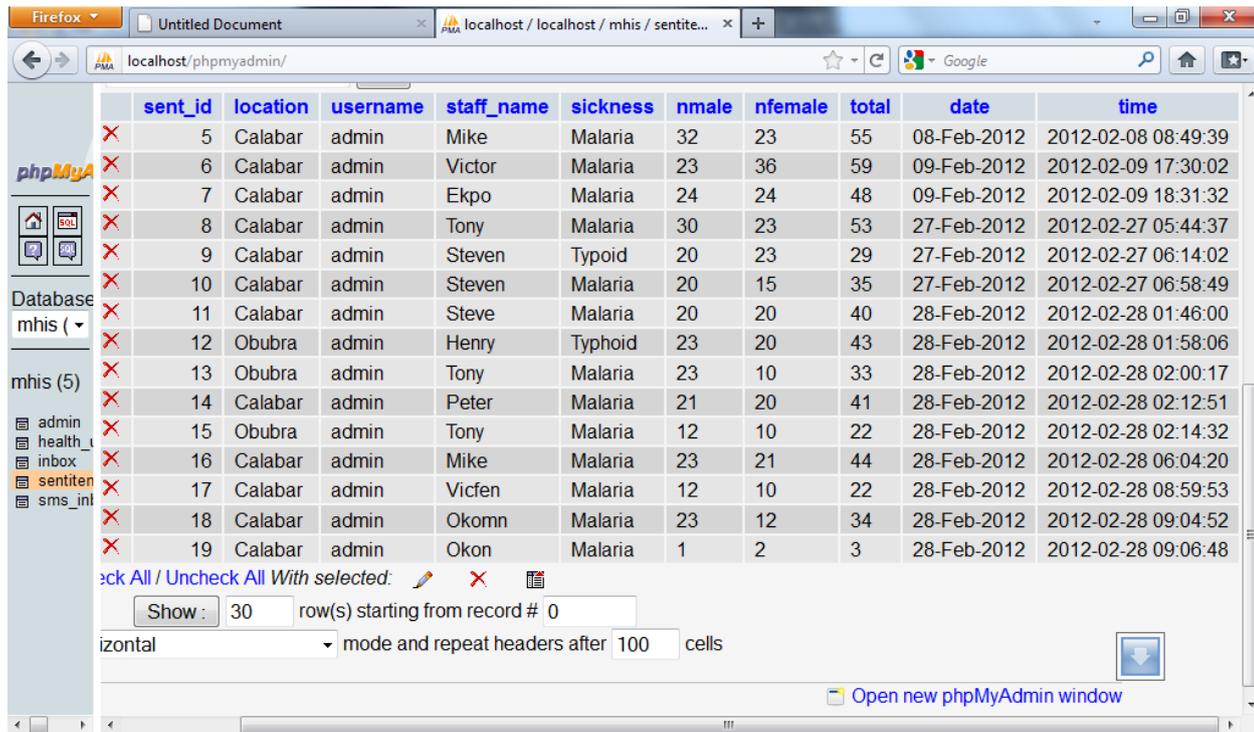
	sent_id	location	username	staff_name	sickness	nmale	nfemale	total	date	time
✗	5	Calabar	admin	Mike	Malaria	32	23	55	08-Feb-2012	2012-02-08 08:49:39
✗	6	Calabar	admin	Victor	Malaria	23	36	59	09-Feb-2012	2012-02-09 17:30:02
✗	7	Calabar	admin	Ekpo	Malaria	24	24	48	09-Feb-2012	2012-02-09 18:31:32
✗	8	Calabar	admin	Tony	Malaria	30	23	53	27-Feb-2012	2012-02-27 05:44:37
✗	9	Calabar	admin	Steven	Typoid	20	23	29	27-Feb-2012	2012-02-27 06:14:02
✗	10	Calabar	admin	Steven	Malaria	20	15	35	27-Feb-2012	2012-02-27 06:58:49
✗	11	Calabar	admin	Steve	Malaria	20	20	40	28-Feb-2012	2012-02-28 01:46:00
✗	12	Obubra	admin	Henry	Typhoid	23	20	43	28-Feb-2012	2012-02-28 01:58:06
✗	13	Obubra	admin	Tony	Malaria	23	10	33	28-Feb-2012	2012-02-28 02:00:17
✗	14	Calabar	admin	Peter	Malaria	21	20	41	28-Feb-2012	2012-02-28 02:12:51
✗	15	Obubra	admin	Tony	Malaria	12	10	22	28-Feb-2012	2012-02-28 02:14:32
✗	16	Calabar	admin	Mike	Malaria	23	21	44	28-Feb-2012	2012-02-28 06:04:20
✗	17	Calabar	admin	Vicfen	Malaria	12	10	22	28-Feb-2012	2012-02-28 08:59:53
✗	18	Calabar	admin	Okomn	Malaria	23	12	34	28-Feb-2012	2012-02-28 09:04:52
✗	19	Calabar	admin	Okon	Malaria	1	2	3	28-Feb-2012	2012-02-28 09:06:48

REFERENCES

Amy C., 2010. Mobile Technology for Healthcare: Just what the doctor ordered? Washington, D.C. and Berkshire, UK: UN Foundation-Vodafone Foundation Partnership.

Darrel N., 1996. Hospital Management System http://ksi.cpsc.ucalgary.ca/courses/451-96/nash/451/func_spec/section1.html Retrieved: August 19[th,] 2011

David A., 2011. How Mobile Phone Can Transform Healthcare http://blogs.hbr.org/innovations-in-health-care/2011/03/david-aylward-the-mobile-phone.html. Retrieved: August 6[th,] 2011

Dongsong Z. and Boonlit A., 2005. Challenges, Methodologies, and Issues in the Usability Testing of Mobile Applications. International Journal of Human-Computer Interaction, Vol. 18, Issue 3 July 2005, pages 293 - 308.

Geena M. S., 2011. Health Phones: A Potential Game Changer in Health Information Management. OJHAS Vol. 10, Issue 1: (Jan-Mar 2011) ISSN0972 - 5997 Published in Mangalore, India.

Gremeen F., 2010. Uganda Project: Applab Uganda http://www.grameenfoundation.applab.org/section/applab-initiatives Retrieved: August 25th, 2011.

Prince A., 2007. Information and Communication Technology and HealthCare Delivery in West Africa. BMJ West Africa Edition Vol.10.2 of May – June 2007, p99.

Sultan S. and Mohan P., 2009. Improving the Self-Care Process for Caribbean Patients with Diabetes through Mobile Learning. International Journal of Education and Development using Information and Communication Technologies, Vol. 5, Issue 4.

Sultan S. and Mohan P., 2009. How to Interact: Evaluating the Interface between Mobile Healthcare Systems and the Monitoring of Blood Sugar and Blood Pressure. In MobiQuitous 2009 Workshop on Ubiquitous Mobile Healthcare Applications. Toronto, Canada, July 13-16, 2009.