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World Health Organization, Geneva
(May 5-June 29, 2014)**

mHealth—The Use of Mobile Applications for Healthcare

**By
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**Under the guidance of
Dr. P.R. Sodani**

**MBA- Hospital & Health Management (MBA-HM)
2013-2015**



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CERTIFICATE

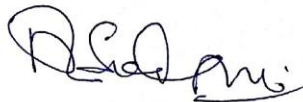
This is to certify that Ms. Shruti Chaturvedi has completed summer training at World Health Organization (WHO), Headquarter Geneva from 05.05.2014 to 29.06.2014, and has conducted the project for the Joint UN program of WHO and ITU, under my personal guidance and supervision. All the data related to the study is the first hand data collected by her.

Project – Program Management support for policy implication under Mobile Health for Non Communicable Diseases

Her approach to the project has been sincere, scientific and analytical. This work is partial fulfillment to the course requirements, recommended for the Post Graduate Diploma in Health and Hospital With specialization in Health Management.

I wish her all the success in future endeavors.


Colonel (Dr.) Ashok Kaushik
Dean (Academic & Students Affairs)
IIHMR, Jaipur


Dr. P.R. Sodani
Dean (Training)
IIHMR, Jaipur

29th June 2014

To whomsoever it may concern

This is to inform you that Ms. Shruti Chaturvedi, Master's student from Institute of Health Management Research, Jaipur has successfully completed her summer training working at WHO. She worked for the joint UN program of the WHO and ITU, mHealth for Non Communicable Diseases (<http://mHealth4nccd.itu.int>), under the guidance of Mr. Sameer Pujari, Technical Officer. During her training, Ms. Chaturvedi was tasked with providing program management support and doing technical review of short codes for policy implication.

The duration of her project was for 8 weeks beginning from 5th May 2014 to 29th June 2014, part of this period was working from India and part working from Geneva (26th May to 29th June). We found Ms. Chaturvedi to be diligent and hardworking and she was able to deliver a concept note on the technical component of her training.

We wish her all the best for a bright and successful future.



Sameer Pujari

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BACKGROUND:

Non-communicable diseases (NCDs) including obesity, cardiovascular disease, diabetes, cancer and chronic respiratory diseases account for an overwhelming majority of morbidity and mortality in the developed world and are emerging as leading causes of morbidity and mortality in low and middle income countries. NCDs place tremendous burden on economies, health care systems and the individuals who are affected by them, including lost productivity, increased medical costs and reduced quality of life. Fortunately, many NCDs can be prevented, managed and, in some cases, cured as a function of lifestyle behaviors such as diet, physical activity, stress management and other NCD risk reduction including routine screening. However, many of the conveniences of modern life have created physical and social environments that work against individual, community and societal levels to promote lifestyle behaviors.

The **World Health Organization (WHO)** and the **International Telecommunications Union (ITU)** have formed a partnership called the **‘m-Health’** Initiative to use mobile technology, in particular text messaging and apps, to help combat non-communicable diseases (NCDs) such as diabetes, cancer, cardiovascular diseases and chronic respiratory diseases. As part of this initiative, they wish to assemble evidence-based and operational guidance to assist countries and governments to implement programme. This document aims to provide a starting point for such guidance with respect to mWellness – mobile phone-based support for people to improve their lifestyles in four health related domains:

1. Nutrition
2. Physical activity
3. Sleep and stress management
4. Risk factor awareness and screening

Mobile health (mHealth) offers considerable potential to improve lifestyle behaviors and decrease the burden of NCDs globally. The rapid proliferation of technology and the ubiquity of access to mobile technologies including mobile devices and wearable sensors have created an opportunity to deliver high-impact, low-cost interventions at population-level scale. The World Health Organisation (WHO) and the International Telecommunications Union (ITU) have formed a partnership called the **‘m-Health’** Initiative to use mobile technology, in particular text messaging, mobile apps, and sensors to help combat NCDs by promoting lifestyle behaviors. As part of this initiative, they wish to assemble evidence-based and operational guidance to assist countries and governments to implement programmes. This document aims to provide a starting point for such guidance with respect to mWellness – mobile phone- and sensor-based support for people to consume healthier diets, be more physically active, better manage stress and receive appropriate risk reduction for NCDs, including screening.

- mHealth—the use of mobile applications for healthcare is a young and dynamic field that could improve the well-being of people around the world.

- Various past researches have established that Mobile applications can lower costs and improve the quality of healthcare as well as shift behavior to strengthen prevention, all of which can improve health outcomes over the long term.
- With reference to various countries like Kenya, Costa Rica, Haiti etc it has been seen that Public health has benefitted immensely from information and communication technologies (ICTs) by applying them to public health practice, research and learning.
- There are strong evidence that smart, innovative mobile technologies can facilitate healthcare, save lives and cut healthcare costs on an unprecedented scale and can make a real difference to people around the world.

OBJECTIVE:

–To Understand and Contribute towards the Development and Trailing of New Services and Application in the area of mHealth”

M-HEALTH GOALS:

- Develop patient-centered healthcare delivery
- Increase self-management of illness
- Alleviate the systemic pressures on the healthcare industry
- Reduce number of hospital beds occupied
- Remote monitoring and smart diagnosis
- Improve disease management

USES OF MHEALTH:

- m-Health applications have helped patients to manage their treatments when attention from health workers is costly, unavailable, or difficult to obtain regularly.
For example, WelTel provides SMS-based messaging to monitor and support antiretroviral (ARV) therapy in Kenya. WelTel's SMS communications are estimated to have raised ARV.
- m-Health applications can also be used for supply chain management, reducing delays in medicine shipments and providing point-of-use technologies for consumers to verify the authenticity of products they buy.
- Patient tracking using m-health applications can also support the coordination and quality of care, especially in rural and underserved communities including the urban poor, women, the elderly.

M-HEALTH: A WINNING SOLUTION

- Low network maintenance
- Remote monitoring in rural areas
- Phones are always on, computers are not
- Carrying a Phone/Tablet is part of a modern lifestyle

- Using a small portable multi-communication computing device is convenient, economical, practical and personal

KEY FACTORS FOR MHEALTH SUCCESS

The potential for mHealth interventions to capitalize on mobile technology to improve the quality of programs, extend the reach of services, and strengthen health information systems is great. However, the roll out of mHealth interventions takes time and significant investment in human, technical and physical infrastructure. Continuous capacity strengthening at multiple levels in the use of mobile technology devices, information dissemination, data collection, and monitoring and evaluation must be factored into project design. Through compilation of this compendium, a range of factors that are critical to successful mHealth interventions were identified.

1. Country Ownership and Leadership

National ownership and full government participation is critical to long term project sustainability. Active engagement ensures the integration of mHealth into existing national and local health sector plans, strategies and systems. National governments also play a central role in the creation and maintenance of an enabling environment for mHealth to thrive through the development and implementation of mHealth-friendly policies. Ensuring that new mHealth interventions align with the country's national eHealth strategy can provide opportunities for addressing important organizational development issues, such as of governance, infrastructure, architecture, workforce capacity, policy and financing.

2. Partnerships

Strong public-private partnerships are key to the success of mHealth initiatives. Across the projects and products profiled in this compendium, prominent partnerships include those with governments, technology software development companies, management consulting firms, international and local non-governmental organizations, mobile network service providers, health service providers, and their clients. Partnerships with different actors may vary at each stage of the process in order to leverage and capitalize on the

3. Coordination

The efforts of all partners need to be properly coordinated, ideally through the leadership of the government. One approach is to establish a technical working group consisting of partner representatives. Collaboration at the level of implementing partners is critical, as well, to ensure that systems are interoperable.

BEHAVIOUR CHANGE COMMUNICATION USING MHEALTH

We make people aware of the bad habits for their health, but still people are using the same habits. The reason behind may be the lack of behavior change communication. The main focus of mHealth is to change the behaviors to see the actual impact on disease management.

mHealth interventions are frequently utilized for community mobilization, awareness

raising, education and demand creation. It has been reported that mHealth BCC interventions are the most predominant of all mHealth interventions and also the most successful. This is because current interventions center on the use of low-cost SMS texts to reach various audiences. Important short-term behavior changes have been observed, though modest.

Most of the currently implemented mHealth applications are stand-alone interventions that use a single channel such as the SMS text to send out information to clients or potential clients or a hotline into which clients can call with questions.

These interventions can reach both the general population and specific populations including adolescents, those most at risk, or people living in hard to reach areas. Only a few BCC mHealth interventions have been linked with other channels of communication such as radio or TV programs. However, this is changing with the increase in use of mobile phones. Other relatively new BCC mHealth applications include those which help the user monitor their own health, such as tracking menstruation cycles to help with family planning.

COUNTRIES IMPLEMENTING MHEALTH FOR BCC

1. Kenya-

System developed by mPedigree and Hewlett Packard assigns codes to consumer drugs that are scratched off by consumers and authenticated by SMS; the system is being launched in Kenya.

2. India-

India's Health Management and Research Institute (HMRI) delivers 104 Advice, an integrated medical center in the state of Andhra Pradesh that has served more than 10 million callers.

3. Uganda-

Text to Change, which originated in Uganda, uses incentive-based quizzes sent by SMS to educate, empower, and engage individuals on health issues such as HIV/AIDS

4. Costa Rica-

The first country to officially participate in the mHealth Initiative for NCDs is Costa Rica. The Ministry of Health approached the WHO-ITU initiative with the aims of reducing the number of tobacco-related diseases in the country. From January 2013, the mHealth Initiative has been working closely with Costa Rica to produce a mobile cessation program for smokers wanting to quit.

5. Senegal-

Alcatel-Lucent is supporting the Senegalese government, represented by the Minister of Health and Social Action, the Minister of Communication and

Digital Economy and local partners, by participating in the "mDiabetes" program launched by the World Health Organization (WHO) and the International Telecommunications Union (ITU) as part of the "Be Healthy, Be Mobile" initiative.

In order to overcome illiteracy and to make the initiative more effective, the Minister of Health and Social Action is planning to create voice messages that offer advice to people with diabetes. This initiative, which is inaugurated around the fasting month of Ramadan, is the first stage of the project in Senegal, with a larger and wider-reaching initiative which will be launched in November 2014.

6. MAMA SouthAfrica-

MAMA South Africa provides information to mothers that promotes earlier antenatal care, supports HIV-positive mothers and helps them understand how to prevent transmission to their babies, and encourages exclusive breastfeeding for all mothers.

7. Nigeria-

The m4Change project aims to equip community health extension workers with a CommCare, a mobile phone decision support application, in order to improve the quality of antenatal care (ANC) services, contributing to the goal of reducing maternal mortality within the framework of Nigeria's "Saving One Million Lives Initiative"

Etc.

M-HEALTH AND DEVELOPING NATIONS

- Haiti's health system is beset by myriad challenges arising from its poverty, geography, emigration of health personnel, and January 2010 earthquake, among other factors. It is also a country where mobile infrastructure reaches farther, in many regions, than roads, electricity, and traditional telephony.
- India is the world's fastest-growing market for mobile telephony, and the market for mobile services is very competitive.
- The growth of India's m-health industry remains hampered by the low value of demand for health services. The government spends relatively little on health, and consumers have a limited ability to pay.
- Kenya has one of the developing world's most advanced environments for mobile technology. Its M-PESA platform, designed for mobile money

transfers but since expanded in services and extended to other countries, is a global point of reference, and mobile telephone coverage is quite broad.

DESIGNING M-HEALTH PROGRAMME FOR A COUNTRY

Some of the important underlying principles to be considered for planning of Wellness Programme:

- ‘Win-win’ philosophy with all partners, particularly considering a long-term strategy that will both enable start-up and deliver financial sustainability in the long-term
- Aiming for the service to be free to consumers to reduce barriers to participation
- Appropriate contractual arrangements with the selected providers ensuring long-term financial sustainability
- Ensuring service provision is sustainable in the long-term, including the phased creation of redundancy, that is reducing dependence on specific suppliers
- Ensuring alignment of the programme with the WHO Global Action Plan for the Prevention and Control of NCDs (2013-2020)

SEVEN KEYS COMPONENTS FOR IMPLEMENTING MHEALTH

- System design
- Data integration and interoperability
- Data quality and security
- Ensuring safety, compliance, and quality assurance (e.g., through prequalification)
- Ensuring clear incentives for impact on health outcomes
- Working with telcos/mobile network providers and aggregators and
- Working with software providers

SOME QUESTIONS FOR IMPLEMENTING MHEALTH

- What sort of arrangement with the telcos and/or aggregator will suit the long-term implementation of the programme?
- Who should hold contractual arrangements around dealing with technical issues that arise (service level agreement)?
- How to ensure the programme is free to consumers and available to all consumers regardless of carrier/network or location?
(Health Care Resource operated for RPA from IIHMR went down because of lack of fund)
- Who is going to develop and/or run the software engine long term (existing provider, in house, external development)?
- What other partners may be required, e.g. aggregator, and who will manage this?

CHALLENGES

In the short term the **blossoming of specific types of mobile health services will have much to do with the combinations of inputs—and, optimally, health needs—present in a country.**

- For example, many m-health applications deliver information to underserved communities using SMS. But SMS is limited to 160 characters and cannot convey images, sound, or interactive content. It is used because many recipients have 2G phones with limited or costly access to online services. But when 3G phones become the standard the medium is likely to change. In the short term the blossoming of specific types of m-health services will have much to do with the combinations of inputs—and, optimally, health needs—present in a given country.
- In countries with weak infrastructure for health, ICT, or both, where m-health is likely to be underdeveloped, these strategies may begin by targeting services such as SMS-based educational campaigns and hotlines for health information or emergency services. Because they require little infrastructure, such services can be the most cost-effective starting points for the m-health industry.
- Where infrastructure is better and standards exist for m-services, m-health strategies can target more complex services, such as direct-to-consumer

healthcare guidance and tools for data collection and treatment management by health workers.

- Establish contractual arrangements with partners Include consideration of issues around intellectual property, security/privacy of mobile phone numbers, the testing plan, expectations of involvement in monitoring and evaluation, and service level agreement for maintenance and dealing with issues as they arise
- Finalise the functional specifications in collaboration with the technical partners

MOBILE HEALTH LONG TERM FUTURE

Every technology involved in an industry like m-health implies some constraint: the speed at which data can be transferred, the size of the network, the memory on mobile devices, the capacity of users, and the like. The same goes for other inputs such as regulation and financing; each sets the boundary for the industry's growth, at a given point in time.

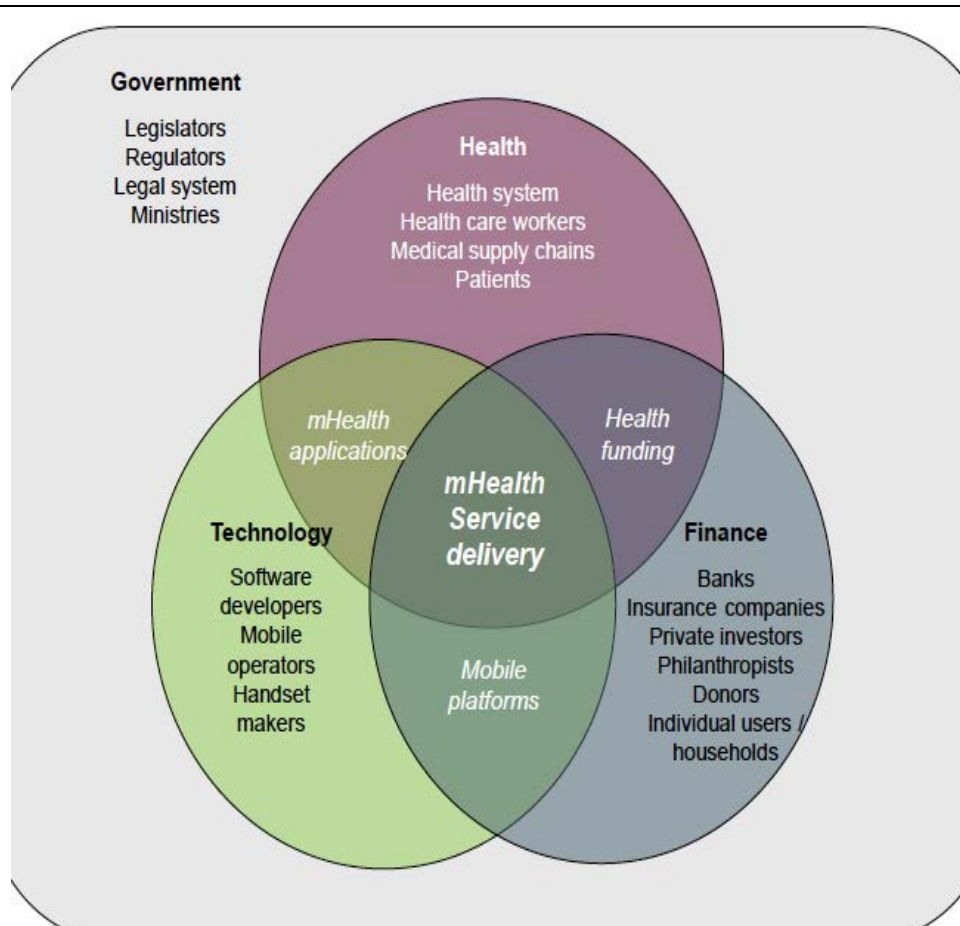
- Forces of innovation are pushing against all these constraints at the same time, though some might be more binding than others. The industry will expand most quickly in the direction where constraints are eliminated: more efficient compression of data, new spectrum opened to mobile networks, booms in private capital for new business models.
- When these changes depend on decisions by actors in the m-health ecosystem, either in a country or globally, they can influence the evolution of the entire industry.
- The process of change following the relaxing of a constraint may involve a proliferation of new interventions and business models. It is likely to stop when a critical mass of users coalesces around a model that offers an affordable, effective solution to an m-health challenge. The equilibrium will hold until another constraint is relaxed and innovation spurts in that new direction.

Documented disbursements for mHealth and eHealth projects in developing countries, 2010 (not exhaustive)

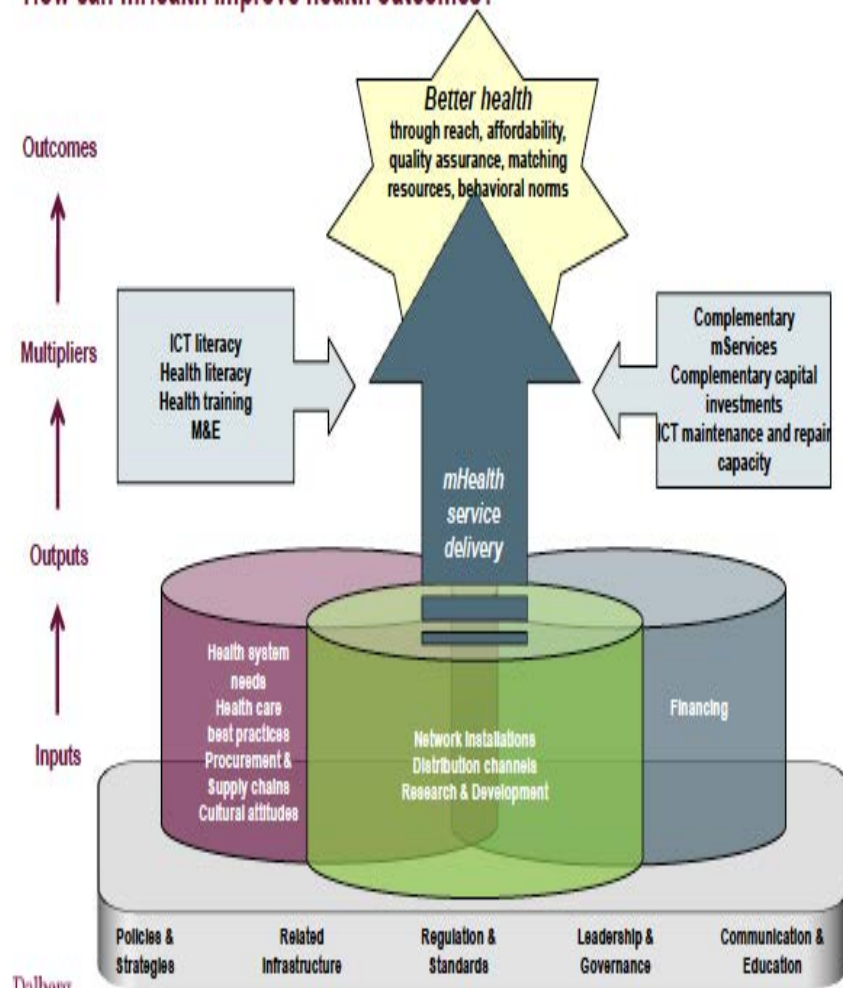
Source of funding	Dedicated mHealth funding	eHealth funding focused on mHealth	Other general eHealth funding
Non-profits	\$ 9 600 000	\$ 1 600 000	\$ 400 000
Donors	\$ 2 400 000	\$ 170 000	\$ 3 100 000
For-profits / CSR	\$ 1 400 000	\$ 600 000	(none documented)
Multilateral agencies	(none documented)	\$ 6 800 000	\$ 400 000
Governments	(none documented)	\$ 25 000	\$ 5 600 000
Total	\$ 13 400 000	\$9 200 000	\$9 500 000

THE MOBILE HEALTH ECOSYSTEM

The m-health ecosystem overlaps several dynamic spheres: health, technology, and finance . Encompassing all these spheres is the influence of government, whose power to set regulations, policies, and strategies can affect all of them throughout the development and use of m-health interventions. The many stakeholders in m-health influence the many drivers through which m-health improves health.



How can mHealth improve health outcomes?



Dalberg

Source: Dalberg research and analysis

CONCLUSION: REALIZING POTENTIAL OF MOBILE HEALTH

- Even at this early stage in the development of the m-health industry, several issues have shown their importance. As governments and their partners begin to consider ways to ensure that the m-health industry has the greatest possible impact on health outcomes—including by building their capacity to incorporate m-health services into their operations

1. Flexibility:

mHealth is a flexible tool for achieving efficiencies and improvements that affect households, health workers, and health systems.

mHealth can also work with other mServices to enhance effectiveness.

2. Evidence based:

m-health business models will only reach full scale if they can create value in sustainable ways. Funders and investors should expect to see rigorous data on the benefits of m-health services and detailed estimates of their costs. Randomized controlled trials and quasi-experimental statistical techniques are already being used to show how m-health applications improve health outcomes.

3. Sustainable business models

Choosing the right business model—for-profit, nonprofit, or hybrid—is essential to implementing m-health services. The main risk facing for-profit models is becoming dependent on startup funding—whether from grants, prizes, or other incentive schemes—rather than long-term demand from users.

4. Interoperability and standards

The power of m-health services is multiplied by their ability to work together, operate on common platforms, and share information. This implies interoperability of m-health applications not only with each other but also with other mobile services and existing health information systems.

5. Literacy and training

M-health services will have greater effects on health outcomes when their users have high levels of literacy—and for health workers, training—in ICT and health. Facility with mobile devices and computers saves time and reduces errors.

6. Privacy and treatment of data

Trust is a critical ingredient in the demand for m-health services. Neither large providers such as government health systems nor individual consumers will use m-health services if the privacy and security of their data cannot be assured. Regulation may be more urgent in this area because rules for handling medical, financial, and other data will have technical implications for m-health applications.

Considering the **potential of mHealth**, in the **manifesto of Government of India (Bhartiya Janta Party)**, the following statements were mentioned:

1. Utilize the ubiquitous platform of **mobile phones for healthcare delivery and set up the 'National eHealth Authority'** to leverage telemedicine and mobile healthcare for expanding reach and coverage and to define the standards and legal framework for technology driven care.
2. Universalization of **emergency medical services**-108.

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3. Technology options for mobile solutions.pdf