

# Mobile Health Card: How to Use Mobile Phones to Increase Rural Immunization Rates

*Rahul Abhisek, Sneha Raman, Muzayun Mukhtar, Ekta Ohri, Saswati Saha-Mitra, Aditya Dev Sood*

## Abstract:

The rural health care system in India, along with many other complex social service institutions operating in India, needs better tracking tools to mark the identity of its beneficiaries. The current approach is paper-and-pen based, requiring extraordinary effort and time on the part of frontline healthcare workers and unnecessary duplication of effort. Two key surfaces are used to track the delivery of services to the beneficiary: the register (system copy) and the health card (user copy). The paper reviews the Routine Immunization (RI) card system and suggests several new directions that could employ mobile technologies to accomplish the existing functions of the RI Cards, while also improving immunization rates. The solutions proposed as well as their likely success are discussed in greater detail in the paper.

**Keywords:** mobile platform, health, mother child, RI card, routine immunization, rural healthcare, Bihar, vaccination, health worker.

## Introduction

India's rural healthcare network, along with many other complex social service institutions, needs better tracking tools to mark the identity of its beneficiaries. The current system employs two key surfaces: the register (system copy) and the health card (user copy). The register is meant to track and maintain a record of the services provided to the beneficiaries, while the health card informs and reminds the beneficiaries to avail these services. The health card demands an interaction initiated by the recipient to avail this information. This approach assumes equal ownership on the service provider as well as the recipient, and could thus function successfully in a scenario where service meets existing demand. But what happens when demand is weak, or in fact absent? The ownership of the service then shifts heavily towards the system and the frontline provider. It not only requires to provide these services when demanded, but to ensure it reaches all recipients targeted, while at the same time rigorously work towards creating an informed user base and generate demand for the future. This paper outlines the key difficulties in maintaining the current system, with a view to proposing possible solutions that employ currently available mobile technologies for the same purpose.

## What the Routine Immunization Health Card Does

The Routine Immunization (RI) Health Card records and provides basic data sets for the Frontline Healthcare Worker (FHW) or service provider as well as the recipient, which we will consider to be the child along with its parent or primary caregiver. It contains the name and other demographic details of the recipient, the vaccines to be administered and their progress as well as the due date for their next doses of vaccines. This card also serves as an instruction card for the recipients about the importance of immunization, precautions, preemptive care, vaccine after-care and other general dos and don'ts. Three grades of FHWs have been observed, each of which has a different relationship with the RI card: Assistant Nurse-Midwife (ANM), Accredited Social Health Activist (ASHA), and Angandwadi Worker (AWW).



Along with the essential information about the recipient, included in the RI health card is also a registration number that is unique to one coverage zone vis-a-vis the recipient. The importance or utility of this serial code remains uncertain among the FHWs and Medical Officers. However, it is clear to us that one of its consequences is to make each card unique, easing searchability in cases of misplaced cards or looking for recipient's name in FHWs data recording tool.

After filling the Mother's name and child's the 'House no' is filled. The concept of house number is found to be not applicable in most recipients case. While Bihar has kuccha and kuccha-pucca houses upto 36.9% and 50.4% (DLHS 3) respectively. In practice, therefore, this entry is often not made.

Though the FHWs maintain their own record of recipients details in a register, they also fill out the card and give it to the recipient. The RI card serves to act as reminder for the recipient family as it states the exact data and time at which the next set of vaccines and secondary doses are due. In an ideal case scenario RI health card should act as a motivator for the recipients to consider getting their child vaccinated.

The use of RI cards, provides a supplementary mechanism for monitoring, tracking or checking district progress and coverage. Apart from enabling the ANM to be aware of her status and directing her efforts accordingly, such massive information feeds into larger national healthcare databases. Considering the complex hierarchy involved in the rural healthcare system, the RI health cards help as a supervision tool for the Monitors, to of the workings of FHWs. The sectioned filled up and their time serve as check points.

The RI card acts as the public face of the healthcare system. This document is the recipient's only form of link to the formal healthcare ecology. It is representative of the Government's efforts but the current approach is ridden with challenges. The card, is the only official document in possession of beneficiaries, granted by the State in the sector of healthcare. Considering that this a public service initiative by the Government, it authorizes them for a free health care service. This is not incentive enough for the recipients and it does not empower them in anyway like other Government issued documents do, in terms of identity, food and produce rations, amongst others.

### Current Approach to Record Keeping

The current approach is paper-and-pen based, requiring extraordinary effort and time on the part of frontline healthcare workers. The form is a thin 100 GSM leaf of paper which is folded in half. The card is a simple leaf of paper, medium grey-green with black on a white background. It is trifoliated, i.e. folds into three, this also makes reading and comprehension because it does not enable itself to be directionally guided. There are challenges around interactional usage as well. There is difficulty in finding the appropriate

data surface immediately. Though one part of the card is torn away and kept by the ANM, the information on the same is not updated. The individual leaflets also pose a problem in storage, and is very often misplaced. Sometimes, the RI health card is kept by the ASHA or AWW and used for tracking, in place of the due list. The counterfoil, thus, in its current state is a vestigial extension of the card, underused in surface as well as intent.

RI health card for mothers is made during her ante natal check-up but in most cases it is not retained till the child's birth, so a new card is issued with a new serial code as well repeated recipient information. The RI Health card also aims to create awareness about the vaccines delivered. Unfortunately, this attempt at information dispersion restricts itself only to the names of the vaccines and not their purpose or efficacy. There is no mention of the importance of having a certain vaccine administered or the impact of missing one. To a great extent, this is on account of the limitations of space on the card.

While the RI card has high systemic value it can affect the acceptance and eventually the uptake of a complete RI service. Unfortunately, this value is not shared by most recipients, for as we have said, demand for the service Routine Immunization is itself weak and variable. These cards are manually updated on a monthly basis on every occasion of vaccination.

As currently designed, the paper format of the health card is meant to serve as a useful tool for the FHW who administers the vaccine in order to 'track' the due date for the administration of the vaccine. However, we have observed that FHWs follow a specific code for writing dates, which is not easily understood by recipients. To this extent, the work practice of the FHW runs counter to the very rationale for the existence of an RI card.

Different grades of FHWs enjoy varying abilities in respect of bureaucratic functioning as well as literacy skills. Some are unable to make entries into the due-list registers, instead they rely on data on the RI cards, which they collect, aggregate and organize, as reminders to mobilize recipients.

### **'Reading' the RI Card**

---

The RI health card has illustrations depicting a mother and her phases in due course of pregnancy and after child birth but the rural masses are unable to comprehend the underlying intent in the picture as the purpose of RI is not conveyed in the same.

On the obverse, one notices a set of squares in varying shades of green, grey and white. The title of each page is marked in green and the same hue marks some of the intermediate squares. This poses a visual challenges for the recipients, as it creates a confusion whether the green colored boxes are of higher importance than the grey or cream colored boxes, and therefore if those vaccines more important than others.

Considering that members of most recipient families are semi-literate, but are easily able to understand visuals, there is a need for the design of the card to place more emphasis on the visual design to ensure that most beneficiaries understand the information content in the card. Adding to this, one of the primary reasons the card is not preserved by the recipients is because they do not understand the content and its significance. Increasing the readability of content through visuals would ensure that this information, is actually valued and used by beneficiaries.

While it is challenging to structure such a large amount of data into the health card, it is equally challenging for the recipient families to comprehend it. Precautions and after care information is provided at the end of the document seemingly unimportant. Such information needs to be visibly displayed at the right intervention areas.

The key information on the RI health card, is structured by the use of bullet points which is rendered useless as the recipients is unaware of such information categorization methods.

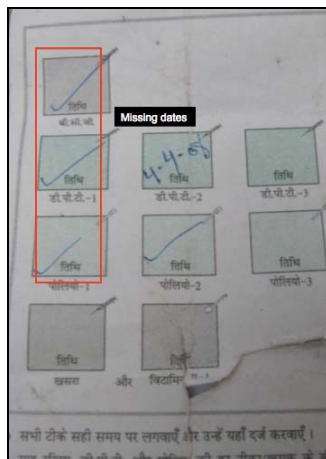
There is also a certain inconsistency in language -- although most of the content is in Hindi, the numbers are in Arabic as well as Roman Numerals. In addition, the importance of certain information is not conveyed through the use of fonts and varied sizes and colours for text. Certain icons of tablets and syringes are used to convey the nature of the vaccine to be given. These too are poorly understood by the recipients and undermines the utility and efficacy of the card.

While the RI card has high systemic value it can affect the acceptance and eventually the uptake of a complete RI service. Unfortunately, this value is not shared by most recipients, for as we have said, demand for the service Routine Immunization is itself weak and variable. These cards are manually updated on a monthly basis on every occasion of vaccination.

As currently designed, the paper format of the health card is meant to serve as a useful tool for the FHW who administers the vaccine in order to 'track' the due date for the administration of the vaccine. However, we have observed that FHWs follow a specific code for writing dates, which is not easily understood by recipients. To this extent, the work practice of the FHW runs counter to the very rationale for the existence of an RI card.

### Challenges in using RI card

The physical, paper format of the card poses certain challenges, regardless of the recipients valuing the card and storing it in a safe place for preservation. It not only increases the chances of destruction by unattended children and rodents, but also has a shorter shelf life. Considering that information documented in the health card is vital and can have serious consequences for the beneficiaries, the need for preserving it for a longer time frame is much more significant. Most often, the card meets its end before the immunization of the child is complete. The tangibility of this health card is a serious obstruction for its preservation.





The RI health card makes efforts to educate the people and compel for full immunization, the language of the instructions is quite complex and a substantial group of literate people are unable to understand it. This also reflects a certain mechanical face of the healthcare system which hinders more uptake. There is a need to make such instructions more colloquial.

The RI Health card has the same sets of information repeated twice. This duplication of effort is massive considering the numbers the ANMs are working with during a RI session and full immunization cycle. This indirectly makes provisions for the FHW to take the information for granted. The ANMs become careless about maintaining the RI health card as well as filling in the details diligently. Often, this carelessness displayed by the ANM translates to the recipients as well and the value of the card is not conveyed.

The data manually entered during the RI session is lots which affects the primary vaccination function of an ANM. At the time of tracking of the child especially when the Health Card is lost by the mother, ANM can retrieve the child's RI records from the system or they have devised their own way of enquiring the approximate birth date of the child.

At times, recipients request the ANMs to administer the vaccine at a different bodily location than directed, due to fear of pain or swelling; the ANM obliges and ignores the serious health consequences this could have on the recipient. The RI Health card informs recipients of the names of the vaccines being administered, it does not mention or depict the positions in which a certain vaccine has to be taken which could reduce the frequency of such intimidating situations.

It is essential to educate the beneficiaries about the various types of vaccines and their schedule. There is also a greater need to inform them about the significance of the same, address the concerns around side effects and provide sufficient information about dealing with these side effects, since the rate of drop outs have been observed to be greater than the % of children who were never entered into the RI system. (The 2001-2 Coverage Evaluation Survey indicated that full immunization coverage levels among children in Bihar was only 13%. BCG coverage level was at 39% indicating poor access and utilization of immunization services. Coverage levels for DTP3, OPV3, measles and vitamin A were at 21.1, 21.1, 13.8%, and 11.1%.) The health card, in the present scenario, fails to do this.

While shadowing an ASHA in rural Bihar, we found that the interest of the beneficiaries is so low that FHWs have to go and remind them about the vaccinations many times over. If the FHW is not there to mobilize them then the recipient family do not bother to get their child immunized. The RI health card is not able to promote itself actively in the community.

Sometimes recipient families arrive at the immunization site with no RI health cards and many others with damaged cards. In situations like these, they are sent back to get the RI cards. This causes them to wait longer for immunization which results in lowered patience and trust in the system, escalating drop out rates.

If the recipients do not possess their RI health cards, the FHW tries to look through the registers as a bypass method. As an instance, the FHW in one such case tried to navigate through her set of Mother and Child Register to track the child and on failing to do so, ended up in issuing a new card and therefore a new entry was created in the register with a new serial number provided to the child. In such situations, an ANM would roughly estimate the last vaccination administered to the child by enquiring about the body position where the last vaccine was administered.

### **Possible Approaches to Technology Solutions**

The introduction of mobile technology can greatly employ a focused structuring and delivery of information and help in mobilization by conveying schedules and locations for specific RI sessions through prerecorded calls. Most FHWs possess mobile phones and are comfortable with the basic calling, searching, and adding contact features on the phone. Some entertainment and media features are also used often.

In the proposed system, the RI health card and most of the activities of the FHW will be put onto a mobile platform, eliminating the current approach. Such a system can facilitate data integration thus eliminating the documentation process. Tracking and searchability will be more efficient and will take lesser effort on the part of the FHW in an automated system. This intergrated format of a database would be able to produce and update the immunization figures of a state. While for such a system to function without much glitches data security and required back ups will be mandatory for effective and desired performance.

Recipient families are unaware of schedule and location of RI session and have to completely rely on FHW, most often the RI card is in tattered condition and fails to produce turn ups. Storing this critical information on a mobile platform would ensure its long-term preservation. It would not only be desirable but also extremely valuable. A mobile platform would ensure an integration of information and subsequent accessibility, therefore overcoming geographical barriers. A mobile platform would help track the migrating population allowing them to be able to get and receive vaccination independent of their custody of the health card.

Though there is a locational serial code to help FHWs segregate recipients, there is a requirement for a unique ID for the beneficiary. In the proposed system, the real time information about the children will be available for the FHW on their mobile phones. There will be only one entry for a child in the system. Each child will have a unique identification number which will be is generated by the system. An information card of the beneficiary carrying the identifying data will be made and stored in the server. This information will be developed by the FHWs in real time when the mother visits the RI session site. The ANM will feed in this information to the system about new entries and the information database will be created. Accessing the information about the recipient instantly will provide ANM with the subsequent vaccination date for the child.

This could also be accessed by the FHW through a biometric technology on the their mobile device, which can retrieve a unique ID and henceforth all the details of the recipient. Alternatively if the same unique ID is on the 'mobile health card' of the recipient's mobile phone, it can be directly synchronized. This will result in accurate and easy searchability with effective tracking of the recipient. This unique ID will be location independent which would also enable migratory populations to access the RI service across nation at any public health centres.

The reach of the mobile device can be exploited to identify more beneficiaries. The FHW can utilize the benefits of her social network created on her mobile phone to reach out to newly identified recipients in a remote manner. Information sharing and updates become

easier with the use of a mobile phone. The FHW can here after follow up for obtaining the required information of the recipient. This also enhances mobilization as information of new recipients will be updated on the go and synchronized into larger servers and databases for the future.

Once the information has been fed into the device, effortless mechanisms on a mobile platform like an automated phone call or text message in the local language about the schedule and location of RI can be highly useful. Most often, there is an unawareness among recipients about timings of RI session, timely information about the same on the mobile phone is aimed at solving this issue.

On the system side, the mobile RI application can provide the list of recipients who are due for immunization to the FHW on her mobile phone much in advance. Frequent reminder in terms of messages or alarm can prompt her to reach as many due recipients as possible and therefore complete immunization for a session. Also, at the end of the session, a simple automated call can inform her of how many recipients were missed and are of high priority for the next RI session which will be conducted in her coverage zone.

### **Benefits & Challenges in Implementing a Mobile Health Solution**

---

We are mindful of the substantial challenges that lay ahead. Just as some FHWs find it difficult to keep up with the pen-and-paper data entry methods they are required to follow today, there may be device and application literacy challenges on a mobile platform in future. The screen of most devices we observed is very small, and not necessarily suitable for detailed form entry. The amount of information held in the current hard RI card is quite large and it would be a substantial visual and interactive design challenge to communicate those elements of data in effective and manipulable ways on a mobile platform. Not all of the technology platforms cited above are robust, and some may have high-latency costs should we attempt to deploy them in an actual field context. To add to this, there will be challenges of data-security, data backup, and in future, data-privacy.

Despite tremendous growth in mobile adoption, not all recipient families have mobile devices today, and that could prove a barrier in future as well. There may be some unanticipated uses for paper-based records that mobile versions cannot serve, including for example submission for identity-proof. Until mobile devices do in fact become ubiquitous, it will be necessary to cycle between formats, pen-and-paper as well as mobile-electronic, just as many offices do now with desktop and printer technology.

Our approach would be to explore in greater detail in future, specific scenarios of use, and the challenges in effecting them, whether cultural, social, technological or otherwise. By iteratively defining what must be done, we expect eventually to arrive at what can be done, and to select the technologies and visual design strategies most conducive to achieving those very goals.

In our view, the benefits of instituting a Mobile Health Card along are great, and substantially outweigh these challenges. These include enhanced efficacy of FHWs, improved abilities to mobilize, contact and coordinate with recipient families, savings of time and mental and physical effort in the creation and maintenance of paper-based records. Moreover, the data generated via mobile devices can more easily be confirmed, cleaned, aggregated and mined, so as to more pointedly target healthcare efforts. Together these gains could result in major increases in rates of immunization in India.

### **Bibliography**

---

Davey, Sheila. State of the World's Vaccines and Immunization. World Health Organization, 2003.

Gragnotati, Michele and Bredenkamp, Caryn. India's Undernourished Children: A Call for Reform and Action

(Health, Nutrition and Population Series). World Bank Publications, 2006.

Jena, Anupam B. Innovation and Technology Adoption in Health Care Markets. AEI Press, 2008.

Merson, Michael H and Black, Robert E. International Public Health: Diseases, Programs, Systems and Policies. Jones & Bartlett Publishers, 2005.

### **Online Sources**

---

[http://www.mohfw.nic.in/INDIA%20RCH%20REPORT\\_Pdf/7.%20CHAPTER-1.pdf](http://www.mohfw.nic.in/INDIA%20RCH%20REPORT_Pdf/7.%20CHAPTER-1.pdf) Ministry of Health and Family Welfare

[http://www.mohfw.nic.in/NRHM/ROP\\_09\\_10/UP/Immunization.pdf](http://www.mohfw.nic.in/NRHM/ROP_09_10/UP/Immunization.pdf) Ministry of Health & Family Welfare: "Immunization Strengthening Programme Uttar Pradesh (2009-10)".

[www.cks.in/mdrcks.in](http://www.cks.in/mdrcks.in)