



Designing Vaccination Monitoring Service

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Approximately 27 million children are born in India each year – the largest birth cohort in the world – but less than 44% receive a full schedule of vaccinations.

Source : content.healthaffairs.org/ & 50 years of Immunization in India: Progress and Future to it.

Motivation

**Indian Institute of Technology, Bombay
IIT Hospital**

Date: _____

All students * should receive following vaccinations prior to admission.

A. Vaccination Certificate:

| Name of Vaccine | Date of Vaccine | Doctor's Signature |
|---|------------------------|---------------------------|
| Typhoid (one dose after June 2008) | | |
| Hepatitis A | | |
| MMR (one dose after 15 years of age is essential) | | |
| Chickenpox (If there is no history of chickenpox in past) | | |

B. Vaccination Exemption Certificate:

Mr./Ms _____ is suffering from _____

and is on _____ treatment. Hence, vaccination is contraindicated in him/her.

Registered Medical Practitioner

* Only those students in whom vaccination is medically contraindicated will be exempted from these vaccinations on provision of medical certificate by registered medical practitioner.

Immunization Status Among 12-23 months Children by States



Objective

Reduce the drop rate in immunisation in urban area for lower middle class families.

Secondary Research

Bill & Melinda Gates Foundation

Gavi, the Vaccine Alliance

Global Vaccine Action Plan 2011 - 2020

Max India Foundation

Uday Foundation

Existing Solutions



Immunize India

A government initiative to remind people about child's vaccination through text messages.

Disadvantages :

There is no periodic reminder. The reminder is given only once 1 day before the vaccination.

Existing Solutions

View: Complete form

Vaccination No. → लसीकरण क्रमांक

Baby's date of birth → बाळाची जन्मतारीख

Name of baby → बाळाचे नाव

Blood group → रक्तगट वय → Age

Name of clinic → दवाखान्याचे नाव

Mother's name → आईचे नाव

Mother's date of birth → आईची जन्मतारीख

Blood group → रक्तगट वय → Age

Father's name → बाबांचे नाव

Father's date of birth → बाबांची जन्मतारीख

Blood group → रक्तगट वय → Age

Landline/ Mobile No. 1 → दूरध्वनी/ मोबाइल क्रमांक: 1

Please write again → खात्रीपूर्वक पुन्हा लिहा.

Landline/ Mobile No. 2 → दूरध्वनी/ मोबाइल क्रमांक: 2

Please write again → खात्रीपूर्वक पुन्हा लिहा.

E-mail → ई-मेल:

Please write again → खात्रीपूर्वक पुन्हा लिहा.

Registration complete → नोंदणी पूर्ण करा. >>>

Calendar: To fill birth date

| | | | | | | |
|-------------------------------|----|----|----|----|----|----|
| १९ फेब्रुवारी २०१९ | | | | | | |
| १ | २ | ३ | ४ | ५ | ६ | ७ |
| ८ | ९ | १० | ११ | १२ | १३ | १४ |
| १५ | १६ | १७ | १८ | १९ | २० | २१ |
| २२ | २३ | २४ | २५ | २६ | २७ | २८ |
| २९ | ३० | ३१ | | | | |
| ◀ २०१० २०१९ २०२२ ▶ | | | | | | |
| ◀ जानेवारी फेब्रुवारी मार्च ▶ | | | | | | |

View: On mobile screen

Design solution

Registration form

I started designing the form after discussion with several parents. In the initial form designed, I used the following features:

1. On adding date of birth, **age** will appear automatically.
2. **Vaccination ID** (like email id) is important for the concept as well as date of birth to verify the data.
3. All the messages will be sent on mobile. If the **email ID** is provided then the same information will be sent on email which could be an **additional backup**.
4. **Baby's name is editable for first three months** due to Indian tradition of baby shower.


Audio visual messages for immunisation

The system sends audio visual messages for awareness.

- Cognitive load for parents
- Identifying the most important information which must be fed by parents
- All the information has to be filled by parents without which they are not allowed to move forward in the app

Existing Solutions

| MCTS | | | |
|--|---|---|--|
| <i>Mother & Child Tracking System</i> | | | |
| (Ministry of Health and Family Welfare) | | | |
| Common Master Administration | Mother Child Tracking System (Data Entry 1) | Mother Child Tracking System (Data Entry 2) | Mother Child Tracking System (Reports) |

 NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन

When a mother dies, children lose their primary caregiver, communities are denied her paid and unpaid labour, and countries forego her contributions to economic and social development.

A woman's death is more than a personal tragedy--it represents an enormous cost to her nation, her community, and her family. Any social and economic investment that has been made in her life is lost.

More than a decade of research has shown that small and affordable measures can significantly reduce the health risks that women face when they become pregnant. Most maternal deaths could be prevented if women had access to appropriate health care during pregnancy, childbirth, and immediately afterwards.

Mother & Child Tracking System

Health track of mothers during pregnancy and after child birth. Used mostly in rural areas run by ANM workers.

- Only works in rural area
- The parents do not get any information from the website

User studies | Methodology

Contextual Enquiry | Semi-Structured Interview

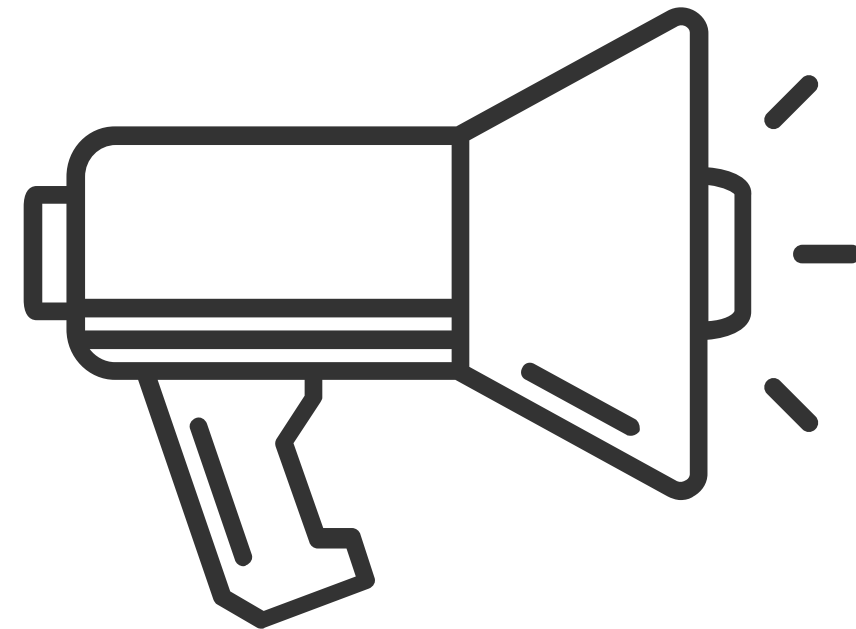
Interviews were conducted with

- 8 parents
- 2 doctors
- 3 students
- 4 nurses

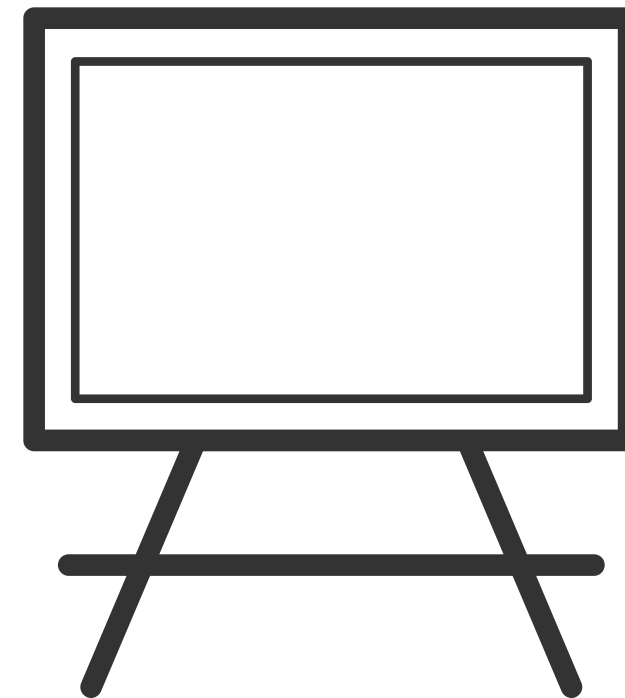
User studies | Insights

- Apathy towards child's vaccination as it ages.
- Knowledge about the vaccination process is missing.
- If the gap between two vaccination is long, they tend to forget.
- Complexity of the entire vaccination programme.
- Vaccination sessions in government hospitals is thought to be a full day affair due to mismanagement of timings.
- Finding the nearest vaccination centre is difficult.
- User preference of the medium of communication is an important consideration.

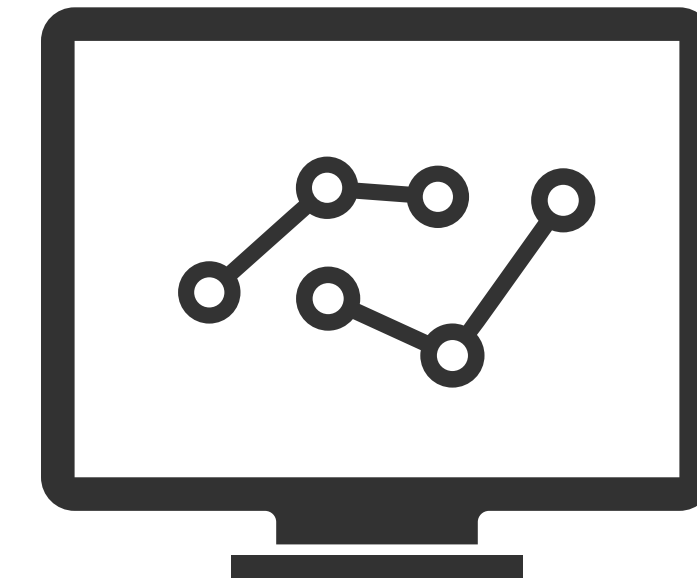
User studies | Need Gaps



Remind parents to take their child for vaccination at an appropriate time and location.



Educate parents about the importance of vaccination sessions and individual doses.



Enable the government and hospitals to **track the data of the child's health records.**

Initial Design Ideas

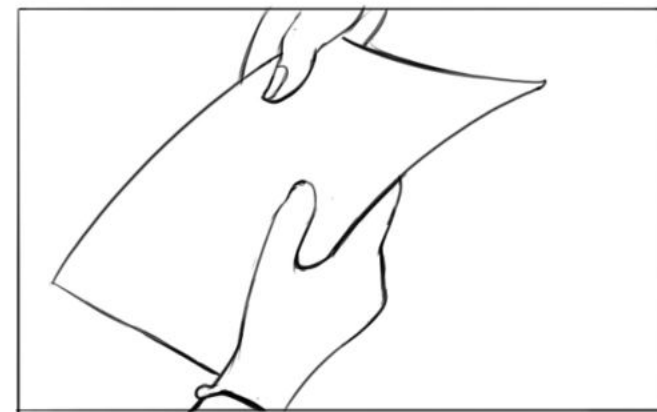


Awareness and Reminder through text messages.

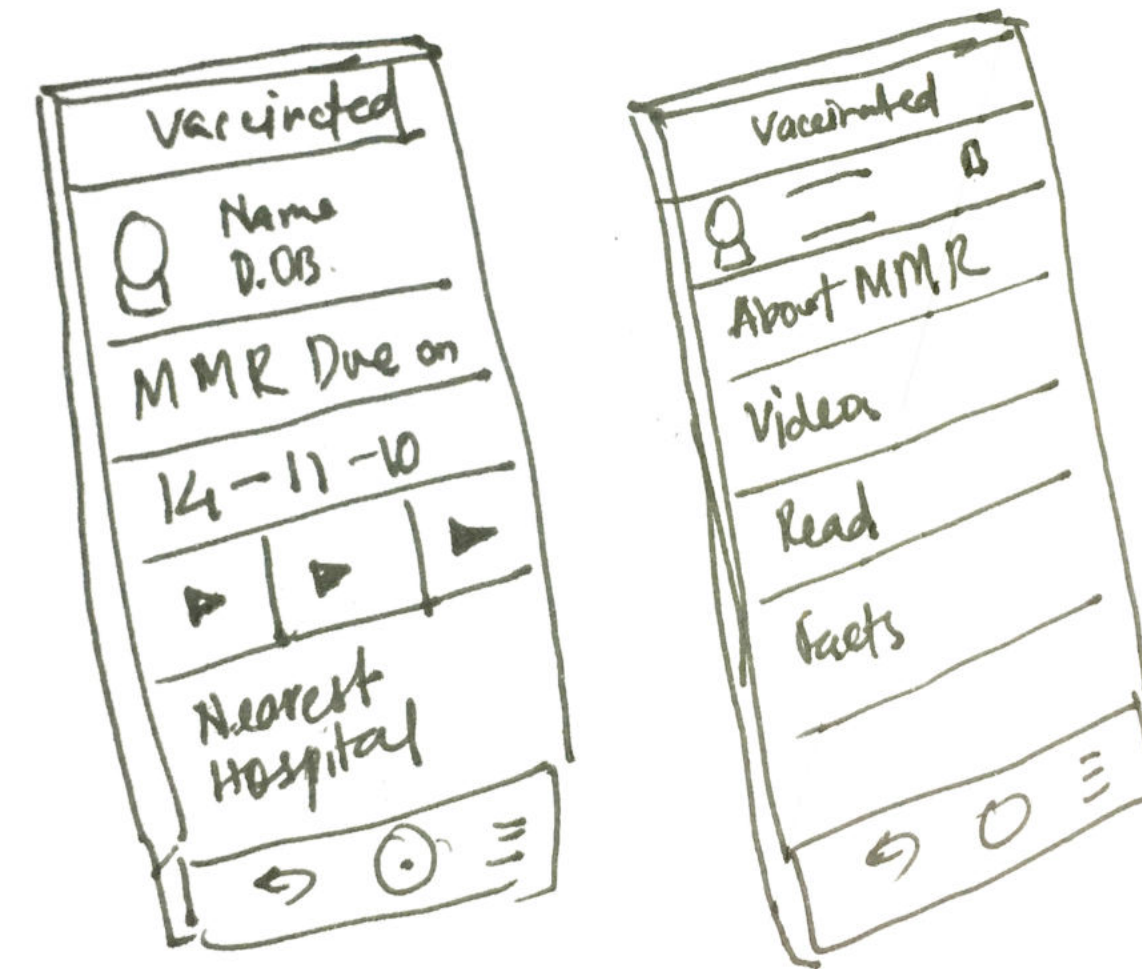


Personalised messages through television
Medium could be anything from text, audio, video or sound.

Initial Design Ideas



- Interactive pamphlet
- Audio visual messages
- Educates about upcoming vaccine and its process



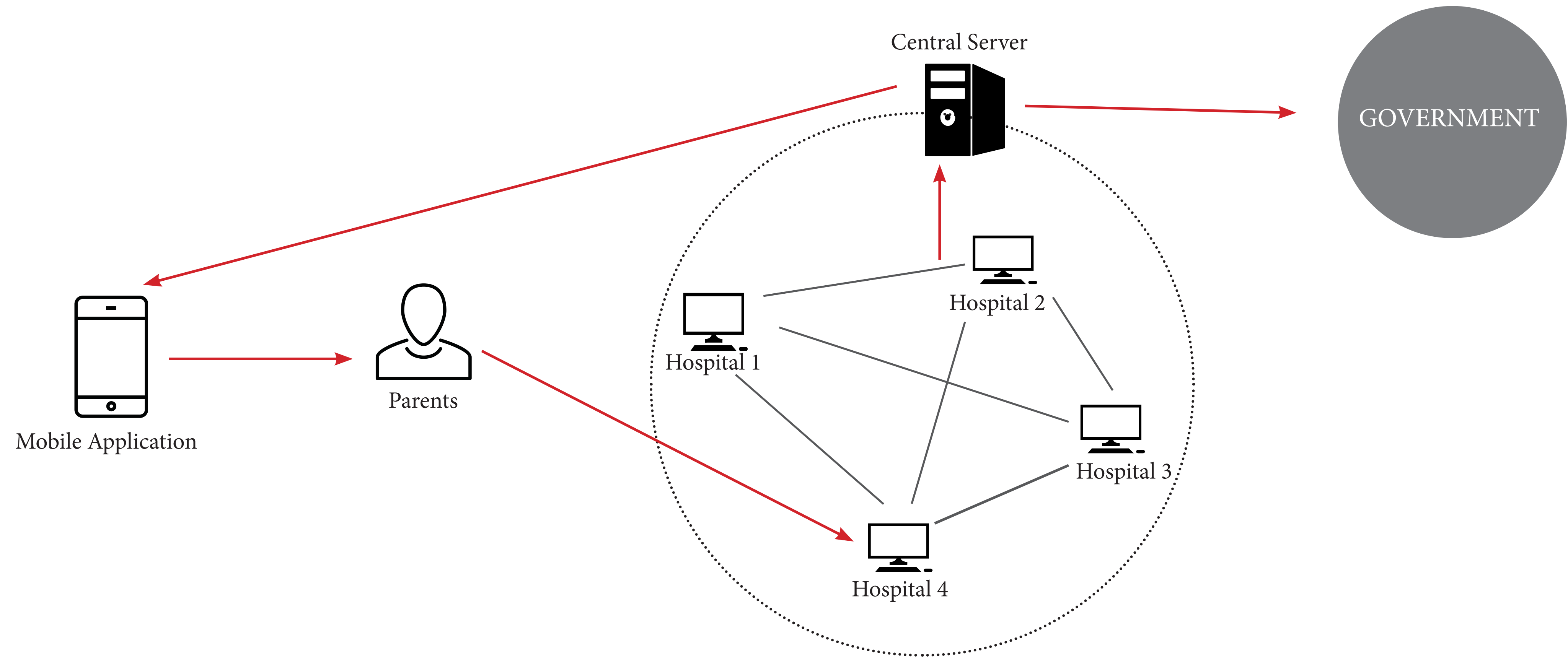
- Create and manage child's vaccination records
- Videos about vaccines.

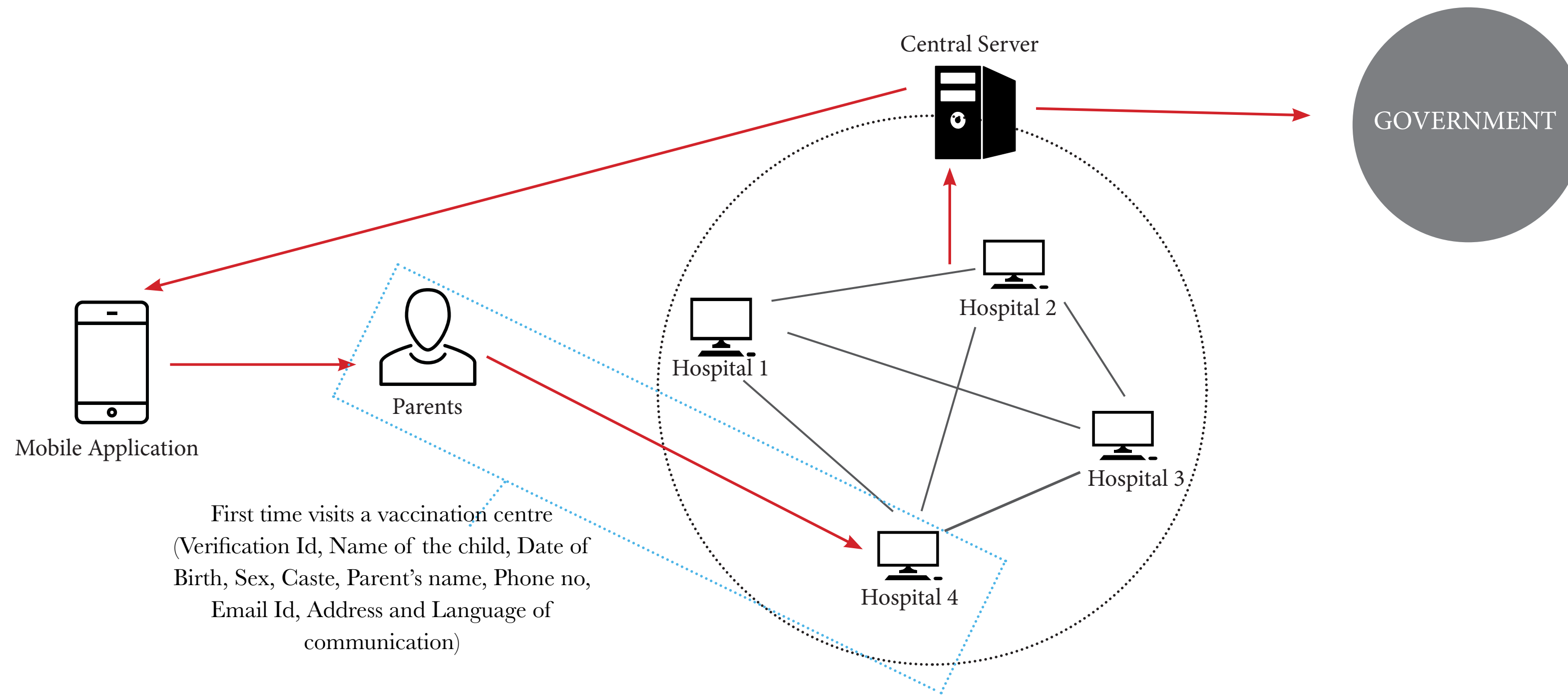
Initial Design Ideas

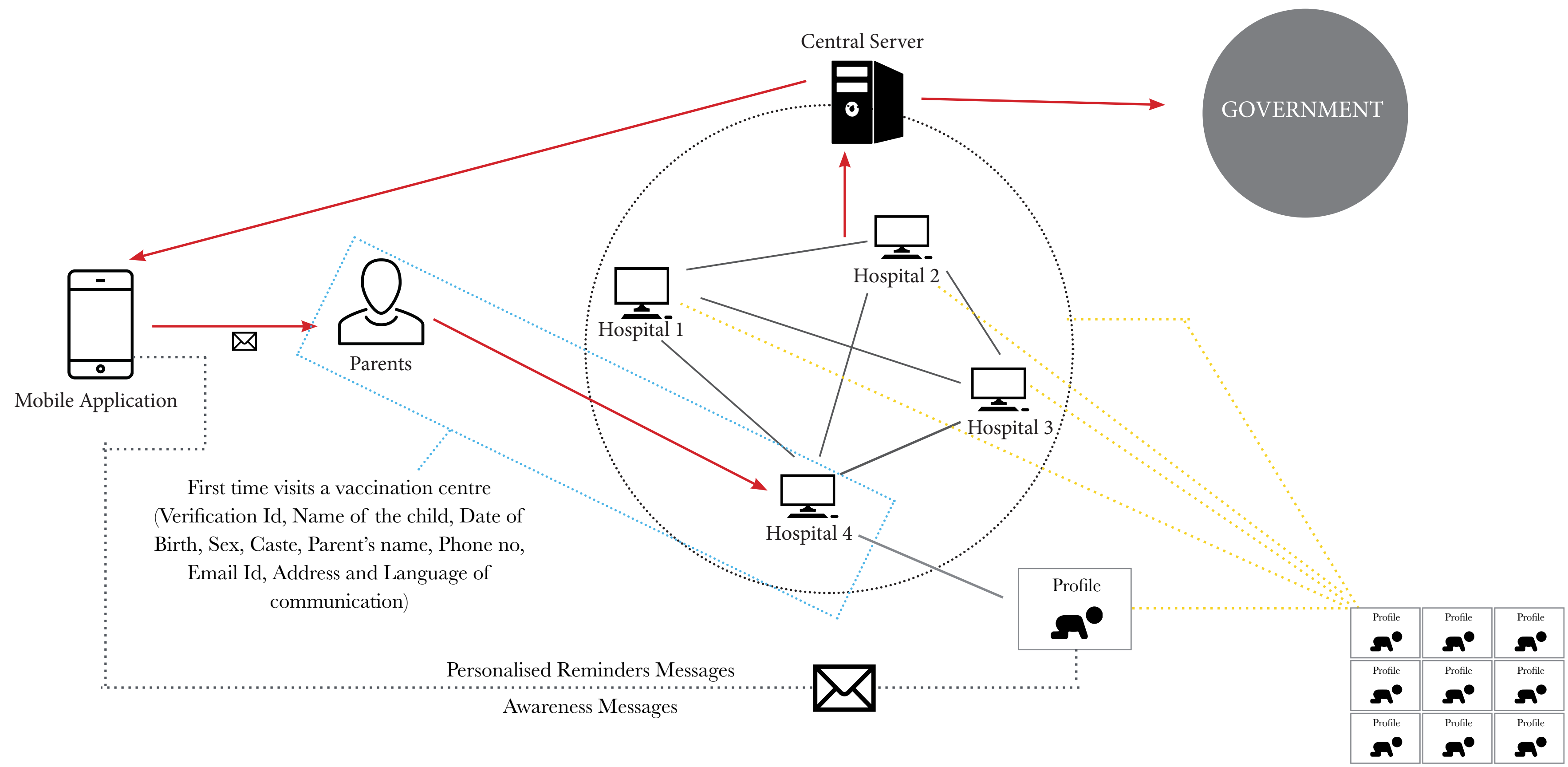


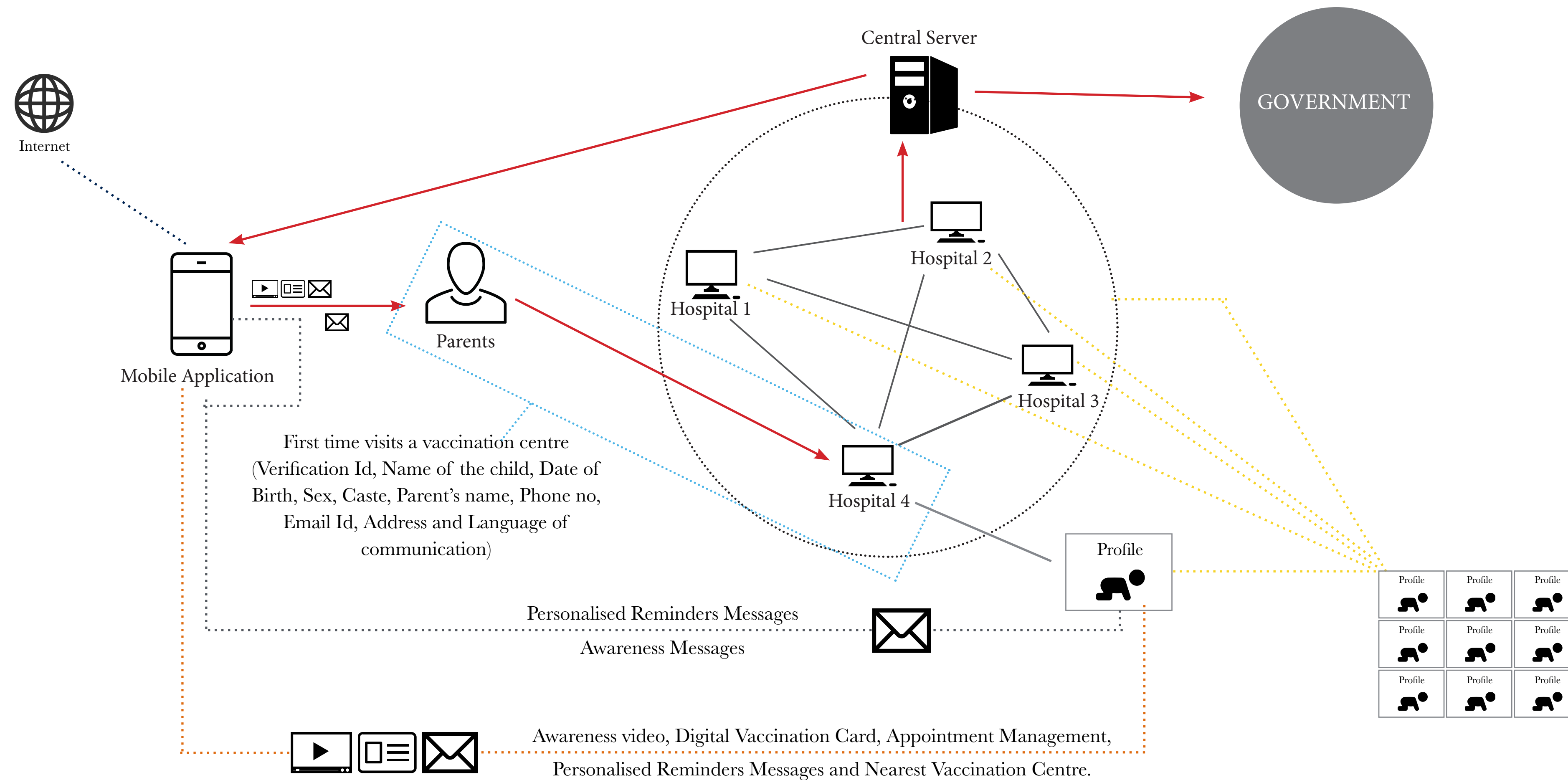
- Centralised system
- Easy and Fast portal
- Database for government and hospitals
- Appointment management

Final Concept









Heuristic Evaluation of Initial Concept | Insights

Service Management
Logged as Nurse

Seema/KEM167 Logout

New Profile

Generate card

Upcoming Patients

Look for Date of Birth Select ---

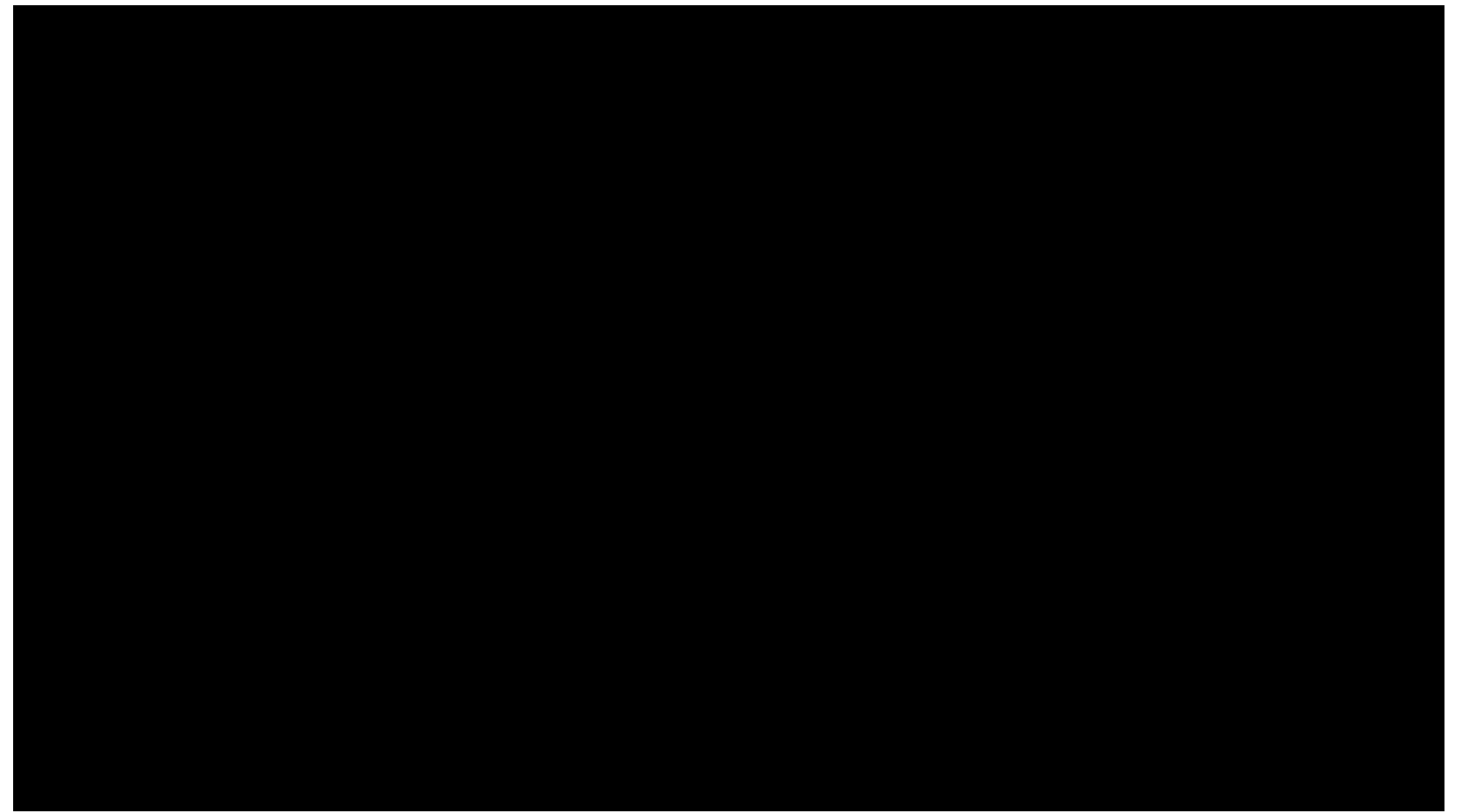
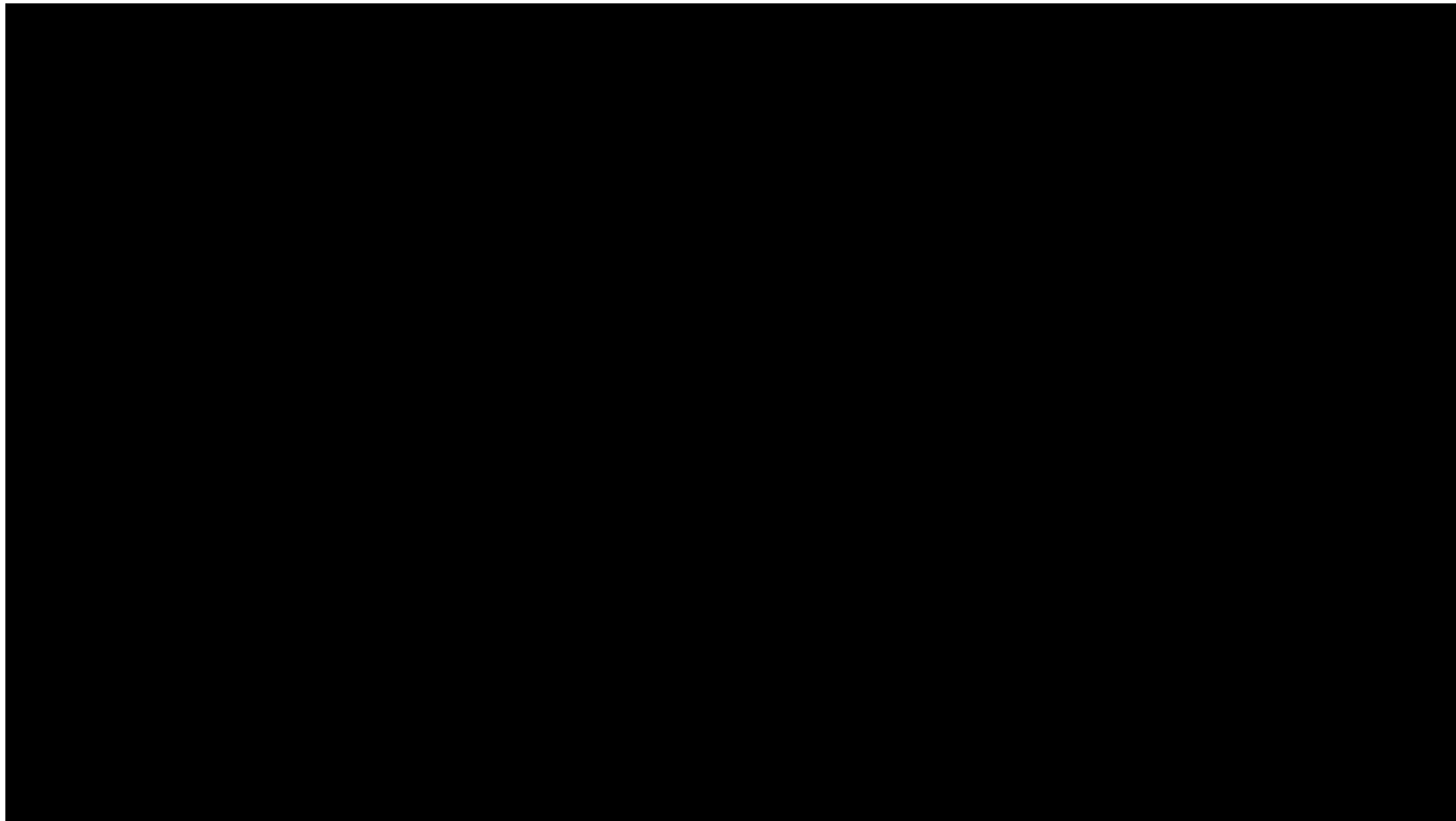
| Card no | Vaccine name | Name of the child | Date of Birth | Timings | |
|----------------------------------|---|-------------------------|---------------|----------|---------------------------------------|
| <input type="checkbox"/> 1008/15 | OPV ₁ , DPT ₁ , HEPATITIS ₁ | Chirag Ghone | 14/09/2014 | 02:00 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | IOPV ₁ , DPT ₁ , HEPATITIS ₁ | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 02:05 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | BCG | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 02:10 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | Hepatitis III | Lorem | 14/10/XXXX | 02:15 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | MMR | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 02:20 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | MMR | Lorem Ipsum | 14/10/XXXX | 02:25 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | DPT II | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 02:30 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | MMR | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 02:35 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | BCG | Lorem Ipsum | 14/10/XXXX | 02:40 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | BCG | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 02:45 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | Hepatitis II | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 02:50 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | Hepatitis II | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 02:55 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | Hepatitis III | Lorem | 14/10/XXXX | 03:00 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | MMR | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 03:05 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | MMR | Lorem Ipsum | 14/10/XXXX | 03:10 PM | <input type="button" value="Update"/> |
| <input type="checkbox"/> 1008/15 | DPT II | Lorem Ipsum Lorem Ipsum | 14/10/XXXX | 03:15 PM | <input type="button" value="Update"/> |

Prev | Next | Last

0 of 16 being selected

Patient management was missing
Exact appointments will create
chaos
Search option on the list missing

Video Messages



Text Messages

1. Awareness

92% 4:23 AM

लसीकरण केंद्र ...
+91 73 53 076726

पोलिओची लस तुमच्या जवळच्या आरोग्यकेंद्रात दिली जाते. हि तोंडावाटे दिली जाणारी लस आहे. पोलिओ झाल्यास कायमस्वरूपी अपंगत्व किंवा प्रसंगी मृत्यूही होऊ शकतो. म्हणून बाळाला पोलिओची लस देणे अत्यंत आवश्यक आहे.

4:23 AM

0/160

To: लसीकरण केंद्र मुंबई

SIM1

2. Reminder

92% 4:26 AM

लसीकरण केंद्र ...
+91 73 53 076726

पोलिओची लस तुमच्या जवळच्या आरोग्यकेंद्रात दिली जाते. हि तोंडावाटे दिली जाणारी लस आहे. पोलिओ झाल्यास कायमस्वरूपी अपंगत्व किंवा प्रसंगी मृत्यूही होऊ शकतो. म्हणून बाळाला पोलिओची लस देणे अत्यंत आवश्यक आहे.

4:23 AM

तुमच्या बाळाचे (कु. सागर) पुढिल लसीकरण शुक्रवार दिनांक २१ मार्च २०१५ रोजी आहे. कृपया त्या दिवशी बाळासोबत जवळच्या आरोग्य केंद्राला भेट द्या.

4:25 AM

0/160

To: लसीकरण केंद्र मुंबई

SIM1

3. Post vaccination

92% 4:26 AM

लसीकरण केंद्र ...
+91 73 53 076726

झाल्यास कायमस्वरूपी अपंगत्व किंवा प्रसंगी मृत्यूही होऊ शकतो. म्हणून बाळाला पोलिओची लस देणे अत्यंत आवश्यक आहे.

4:23 AM

तुमच्या बाळाचे (कु. सागर) पुढिल लसीकरण शुक्रवार दिनांक २१ मार्च २०१५ रोजी आहे. कृपया त्या दिवशी बाळासोबत जवळच्या आरोग्य केंद्राला भेट द्या.

4:25 AM

पोलिओची लस दिल्यानंतर काही त्रास होऊ शकतो जसे की चेहरा लाल होणे, सुज, ताप, उल्टी, वगैरे. त्रास वाढल्यास डॉक्टरांचा सल्ला घ्यावा.

4:26 AM

0/160

To: लसीकरण केंद्र मुंबई

SIM1

Limitations

- The project assumes that the penetration of smart phones in India will increase over a span of time
- Only a limited amount of information can be passed on to the target audience
- As of now, the system does not have multi-lingual support
- The government as a stakeholder needs to be explored more in terms of their requirement

Evaluation

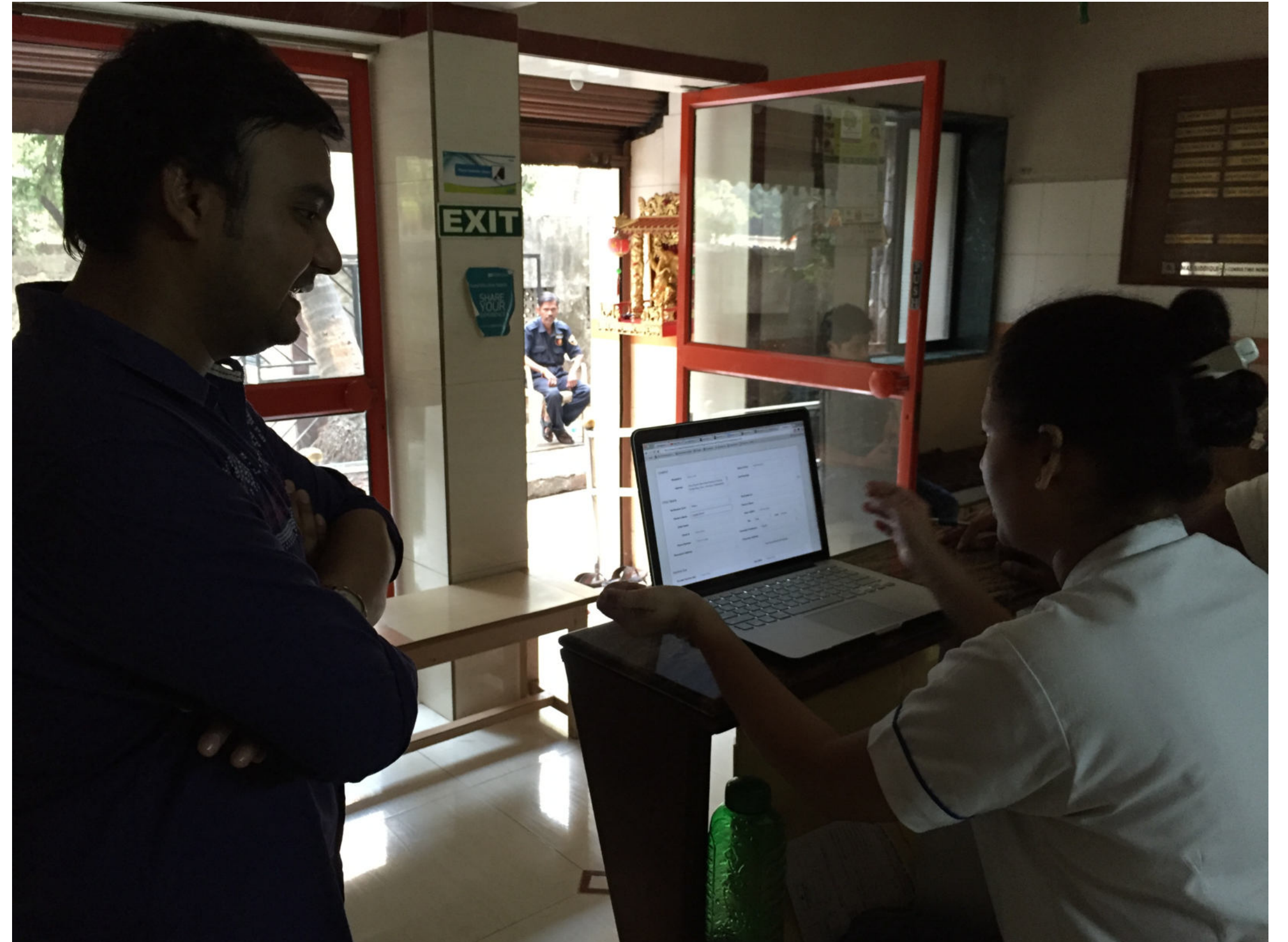
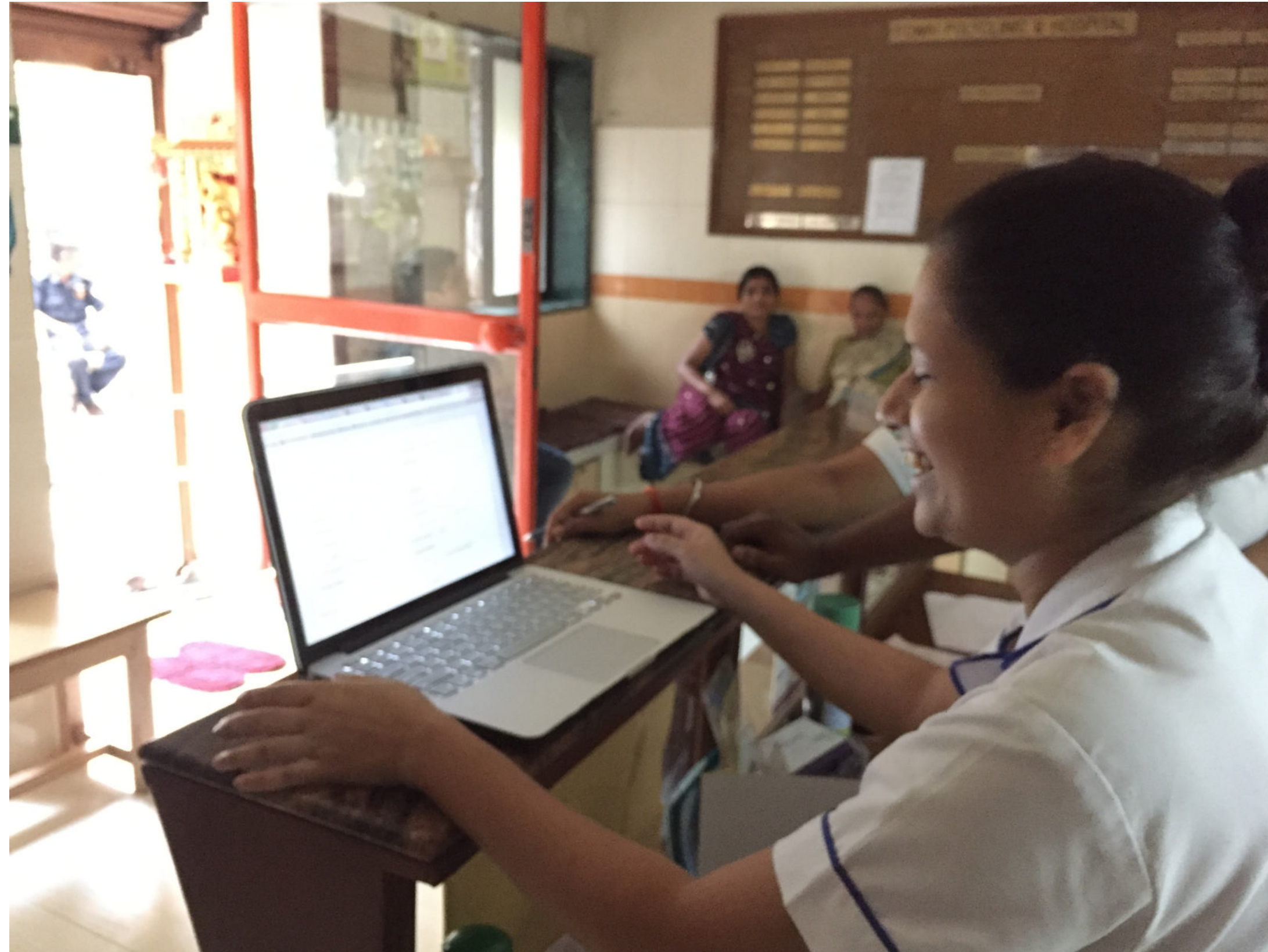
Three components of the system were evaluated :

The reminder messages

The website - Think aloud

Mobile application - Heuristic evaluation

Think Aloud



Think Aloud

VACCINATED | Reports | Seema/KEM-19265

UPCOMING PATIENTS | **NEW PROFILE** | INVENTORY | HELP

Search for patients here... Maharashtra GO

14TH OCTOBER 2014

LOCATION

Hospital Id: MUM-KEM167 | Date of Entry: Select

Address: King Edward Memorial Hospital, Acharya Donde Marg, Parel, Mumbai, Maharashtra 400012 | Card No:

CHILD DETAILS [edit](#)

Verification Card: Select | Verification Id:

Parent's Name: | Parent's Name:

Child's Name: | Date of Birth: Select

Email Id: | Sex: Select | Caste: Select

Phone Number: | Reminder Preference: Select Language

Permanent Address: | Temporary Address:

VACCINE DUE

Current Vaccine Due: | Due Date:

UPDATE

Upcoming Patients | Generate Card | New Profile | Inventory | Help | Contact Us | Email: info@vaccinated.com | Help desk: 08022222222 | English

VACCINATED | Reports | Seema/KEM-19265

UPCOMING PATIENTS | **NEW PROFILE** | INVENTORY | HELP

Search for patients here... Maharashtra GO

14TH OCTOBER 2014

EXPECTED | **ARRIVED** | Search for patients here.....

| # | Card no | Vaccine name | Name of the child | Date of Birth | Scheduled at | |
|----|---------|----------------------------|---------------------|---------------|-----------------|---|
| 1 | 1005/21 | OPV, DPT, HEP ₁ | Chirag Ghone | 14/09/2014 | 02:00 -03:00 PM | + |
| 2 | 1010/12 | OPV, DPT, HEP ₁ | Meenakshi Shah | 14/06/2014 | 02:00 -03:00 PM | + |
| 3 | 1000/12 | MMR | Tanya Thukral | 14/12/2013 | 02:00 -03:00 PM | + |
| 4 | 1000/13 | JEEVAN SATWA ₁ | Muhesh Kore | 14/12/2011 | 02:00 -03:00 PM | + |
| 5 | 1005/21 | OPV, DPT, HEP ₁ | Tapan Kumar | 14/09/2014 | 02:00 -03:00 PM | + |
| 6 | 1010/12 | OPV, DPT, HEP ₁ | Tamana Rao | 14/06/2014 | 02:00 -03:00 PM | + |
| 7 | 1000/33 | MMR | Vivek Thukral | 14/12/2013 | 02:00 -03:00 PM | + |
| 8 | 1000/16 | JEEVAN SATWA ₁ | Vijay Gaikonde | 14/12/2011 | 02:00 -03:00 PM | + |
| 9 | 1023/14 | JEEVAN SATWA ₁ | Rajesh Prasad Ghone | 14/12/2011 | 02:00 -03:00 PM | + |
| 10 | 1021/14 | JEEVAN SATWA ₁ | Prasad Shindeh | 21/12/2010 | 02:00 -03:00 PM | + |
| 11 | 1032/24 | OPV, DPT, HEP ₁ | Pratap Ghone | 22/09/2014 | 02:00 -03:00 PM | + |
| 12 | 1010/12 | OPV, DPT, HEP ₁ | Meenakshi Iyer | 14/06/2014 | 02:00 -03:00 PM | + |
| 13 | 1002/19 | MMR | Sukveer Thukral | 14/12/2013 | 02:00 -03:00 PM | + |

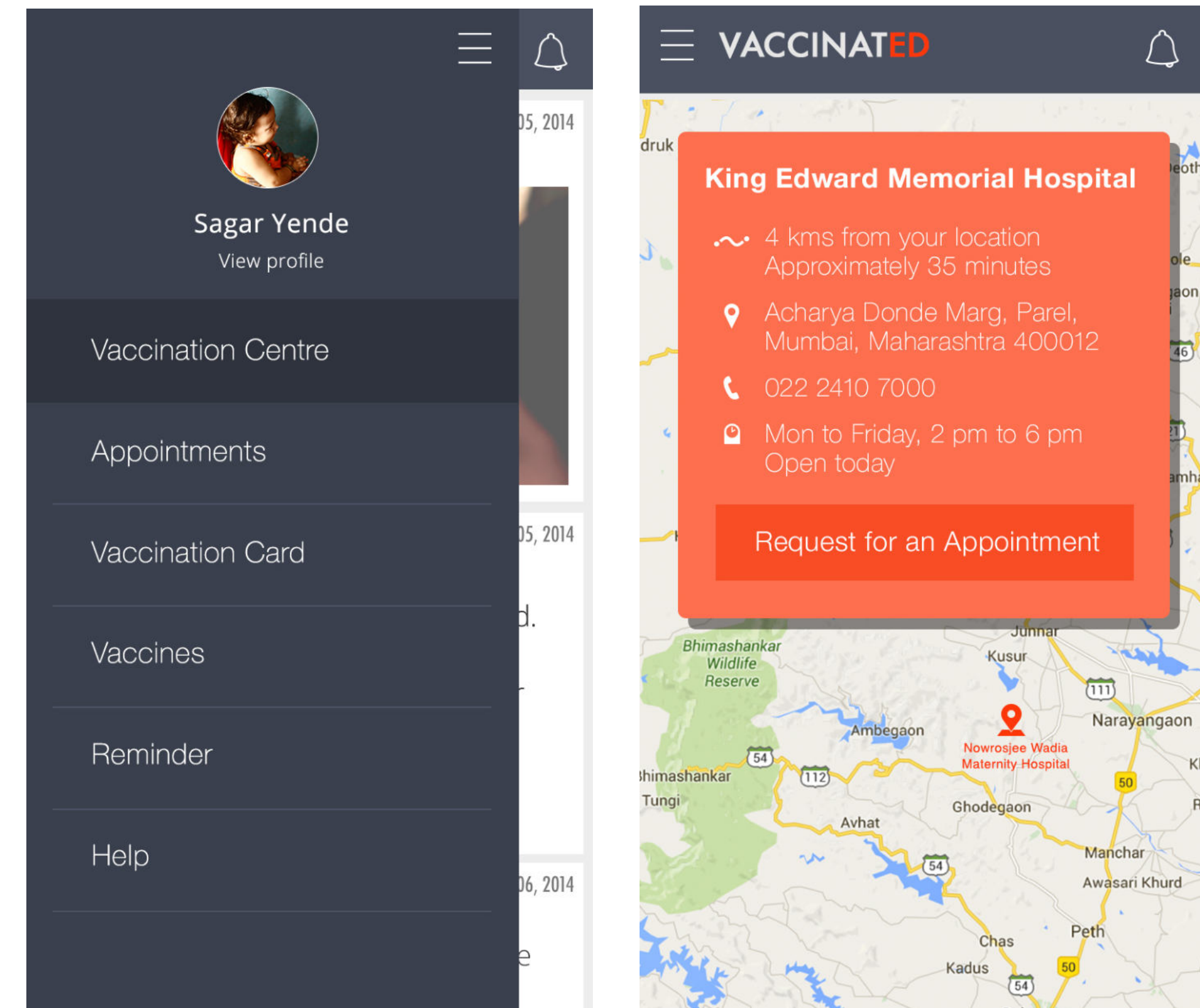
Upcoming Patients | Generate Card | New Profile | Inventory | Help | Contact Us | Email: info@vaccinated.com | Help desk: 08022222222 | English

Tasks :

1. Add 2 patients from expected list to arrived list.
2. A new baby is born in the hospital, create profile and fill the details

Heuristic Evaluation of the App

Done with group of four interaction students.



Evaluation | Findings

- Change names of the following options: Vaccination Centre >> Find Vaccination Centre ;
- Vaccines >> Vaccine Information
- In the vaccination card option, the dropdown menu options of printing and saving are redundant and should be discarded
- List of vaccination cards should be in a list format rather than a 2 column grid
- The information about the next vaccination should be made explicit
- There should be an option of multi language support

Evaluation | Findings

- Contextual notification should be a top priority.
- Know information of the next vaccination should be on top. Notifications should be last first.
- Important notifications like the next appointment schedule should be highlighted.
- The arrangement of options in the hamburger should be changed to appointments, vaccination card, vaccination centre and vaccines.
- When booking or changing appointments, there should be an option of editing the hospital venue
- In the vaccination centre option, the nearest vaccination centre from the users location should be highlighted

Future Work

- Multiple Language Support
- Report generation and visualisation of spatial data
- Conducting workshops to get the nurses acquainted with the digital interface
- Expanding the scope of target audience

Conclusion

The content and medium has the potential to create awareness among the target audience

The awareness process and the appointment management system can reduce the number of unnecessary visits by the concerned parents

The centralised system has the potential to reduce considerable amount of effort put in by the nurses to maintain the physical registers

That's all Folks