

## HOSPITAL NEWBORN BABY MONITORING SYSTEM

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### STORY

IoT is the new challenge at the same time the best way to improve people life quality. Actually, my story started at 13.12 o'clock on Friday 30 May 2014 after my son was born. In a few minutes, the nurse and the doctor took him to perform some health check tests to see whether our baby needed urgent medical care. And our exciting and nervous waiting started in front of the baby's room to see him because as every parent we had a lot of questions "How is he? Do we need to feed him? How is his body temperature? Can he sleep well? Does he have hepatitis B" to ask Doctors and Nurses while he was staying in the newborn baby's room as well as Hospital staff has the same questions to follow babies closely. Two years ago I tried to find a solution to myself but I had limited time in Hospital, so I could not focus on this topic too much I. However, I had a chance to talk to one of Nurses who was responsible to take care of my son as well as to listen what kind of challenges she has at Newborn Service in Hospital. Now, after this IoT class and training, requirements and solution are more mature and clear in my mind. Finally, I decided to design my solution from 'Nurses and Doctors' point of view, because of they are challenging with this issue every day, however solution can be used by parents with role based authorization. Because, newborn babies are very sensitive and we can help by taking care of their health and basic needs.

As a summary, this system will be built in beds/incubators and newborn room of babies as well as system will use

- i. baby wrist bands with sensors to measure body temperature and heart rate of baby and other sensors to record sleep patterns of baby, to measure environment temperature and RFID labels to follow them in Hospital (we can add some other useful tools to collect data about newborn baby)
- ii. room cameras and/or intensive bed cameras to see general conditions in newborn room, empty beds as well as to follow babies closely and to get information about baby's sleep pattern and movements
- iii. integration interfaces to collect data from other Lab systems and to create data pool
- iv. interfaces to show health data, pictures and videos of babies for Nurses and Doctors (as well as for Parents)

Above the things are given as a summary of persona's needs to define a framework for project, and more detailed information will be given following pages.

### PERSONA

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**Name:** Bedriye

**Job:** Nurse at Newborn service

**Background:** Bachelor in Nursery, 35 years working experience and in particular 10 years in Newborn service. Working in a government Hospital.

**Job Responsibilities - Main Task and Frequencies:**

- Monitoring specialized equipment (heart rate, temperature etc.), including incubators and ventilators
- Providing education, information and support to patients' families regarding neonatal, intensive and postpartum care
- Performing diagnostic tests and other procedures, such as intubation and blood draws
- Ensuring proper feeding and basic care

**Needs and (Pain Points):**

- I need to monitor body temperature and heart rate of babies regularly without waking up them
  - **Pain Point:** I need to visit each baby one by one it takes too much time
- I need to provide regular information for Parents about their babies while babies are staying in newborn room

- **Pain Point:** Now they are asking me too many question, also, they are calling me in very frequently to ask a question that I answered in 5 min ago, this is reducing my efficiency and motivation as well as making me frustrated
- I need to create a daily report for each baby with data what I measured and which are coming from Lab tests to present Doctor on time and without any typo.
  - **Pain Point:** Now I am spending too much time to measure manually as well as it is not easy to get Lab test results from different systems then I need to merge them and this takes too much time and also there can be some errors

**Main Goals:**

- To monitor babies as real-time and to collect data regularly while they are in newborn room and also they are in their parent’s room as remotely
- Decreasing paper, manual work and increasing efficiency. Also Utilizing her work
- Consolidating all the data in one pool
- Showing real time data and consolidated reports for Doctors, Nurses and Parents
- Eliminating to constraints and creating platform independent interfaces for users that they can use anywhere with any device

**Stakeholders:** Manager of Hospital, Head of Doctors, Head of Nurses, Newborn Service Chief, Babies and Parents

**Competencies:**

- Open to change and easygoing,
- Supports new technologies,
- Experienced professional
- Knows policies, procedures and operations very well

## USER EXPERIENCE JOURNEY

ACTIONS	<ul style="list-style-type: none"> <li>a) Hand over from colleague who responsible from previous shift</li> <li>b) Preparation for new babies</li> <li>c) Collect and consolidate data for visit report</li> <li>d) Create a report for daily visit report for Doctor about current babies</li> </ul>	<ul style="list-style-type: none"> <li>a) Registration of new babies</li> <li>b) Preparing and Controlling health checklist</li> <li>c) To pick up babies from parents' room and drop of babies to parents' room</li> </ul>	<ul style="list-style-type: none"> <li>d) Performing tests and some other activities feeding for new and current babies</li> <li>e) Parent relationship and training activities,</li> <li>f) Gathering and entering of available data in to system to create historical data for baby</li> </ul>	<ul style="list-style-type: none"> <li>g) Creating hand over report for next shift (Control babies, gather required data, identify critical issues)</li> <li>h) Hand over to colleague who responsible from next shift</li> </ul>
MINDSET	<ul style="list-style-type: none"> <li>a) There are to much newborn to make preparation</li> <li>b) Ohh! I need to visit blood testing Lab, they did not send the test results.</li> <li>c) I hope this time my report will be error free!</li> </ul>	<ul style="list-style-type: none"> <li>a) These babies are so cute</li> <li>b) Time to control welcome to world!</li> <li>c) Baby X should be this room, OH sorry that is my mistake, this paper shows wrong!</li> </ul>	<ul style="list-style-type: none"> <li>a) Time to eat ☺ , recording of test results and activities</li> <li>b) Hi Madam/Sir ...☺</li> <li>c) I lost myself in data</li> </ul>	<ul style="list-style-type: none"> <li>a) Report preparation</li> <li>b) Time to Handover</li> </ul>
FEELING	<ul style="list-style-type: none"> <li>a) Happy</li> <li>b) Happy</li> <li>c) Frustrated</li> <li>d) Frustrated</li> </ul>	<ul style="list-style-type: none"> <li>a) Happy</li> <li>b) Happy</li> <li>c) Happy / Frustrated(Sometimes)</li> </ul>	<ul style="list-style-type: none"> <li>a) Happy</li> <li>b) Happy</li> <li>c) Happy</li> </ul>	<ul style="list-style-type: none"> <li>a) Nervous</li> <li>b) Happy</li> </ul>
TOUCHPOINT	Opening shift, Getting ready, Reporting	Registration, Health Check, Monitoring, Baby transfer	Tests and results, Monitoring, Communication, Data operations	Closing Shift, Handover and reporting

## POINT OF VIEW

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- As a Nurse I need a tool which is integrated with other Hospital Management Systems to monitor and to follow up health care of all newborn babies any time from on my computer, phone or tablet so that I will have more time to take care more babies, that will increase the time to do my value added tasks
- As a Nurse I need to create a daily report for each baby with data what I measured and which are coming from Lab tests to present Doctor on time and without any typo so that will reduce errors due to manual work.
- As a Nurse I need to provide regular information for Parents about their babies while babies are staying in newborn room so that will reduce number of call as well as increase my efficiency and motivation.
- As a Doctor I need to see and show well organized and good quality reports rather than to review separate reports so that I can give healthy decisions about babies and parents can get informed with easy way

## MOCK UP (BUILD LINK)

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### SITEMAP

#### Home Screen

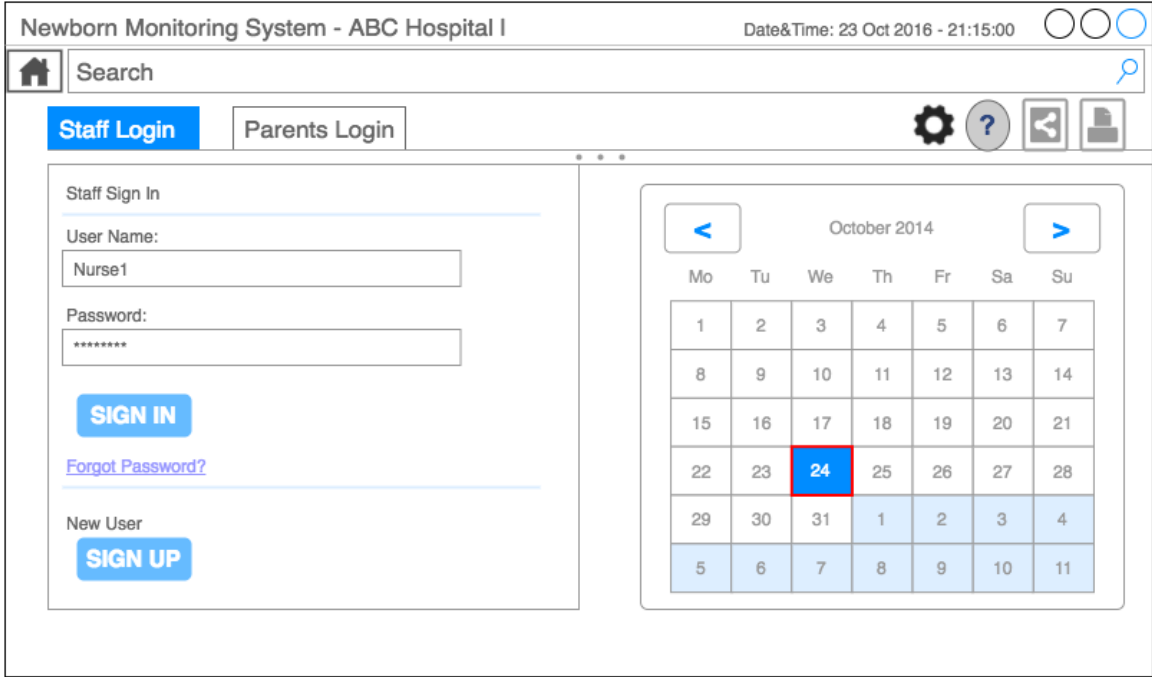
- Login
  - o Staff ( PS: Mockup and sitemap are designed for Hospital Employers)
  - o Parents (PS: In this study I will not
- Registration
  - o Staff

#### Newborn Room General View

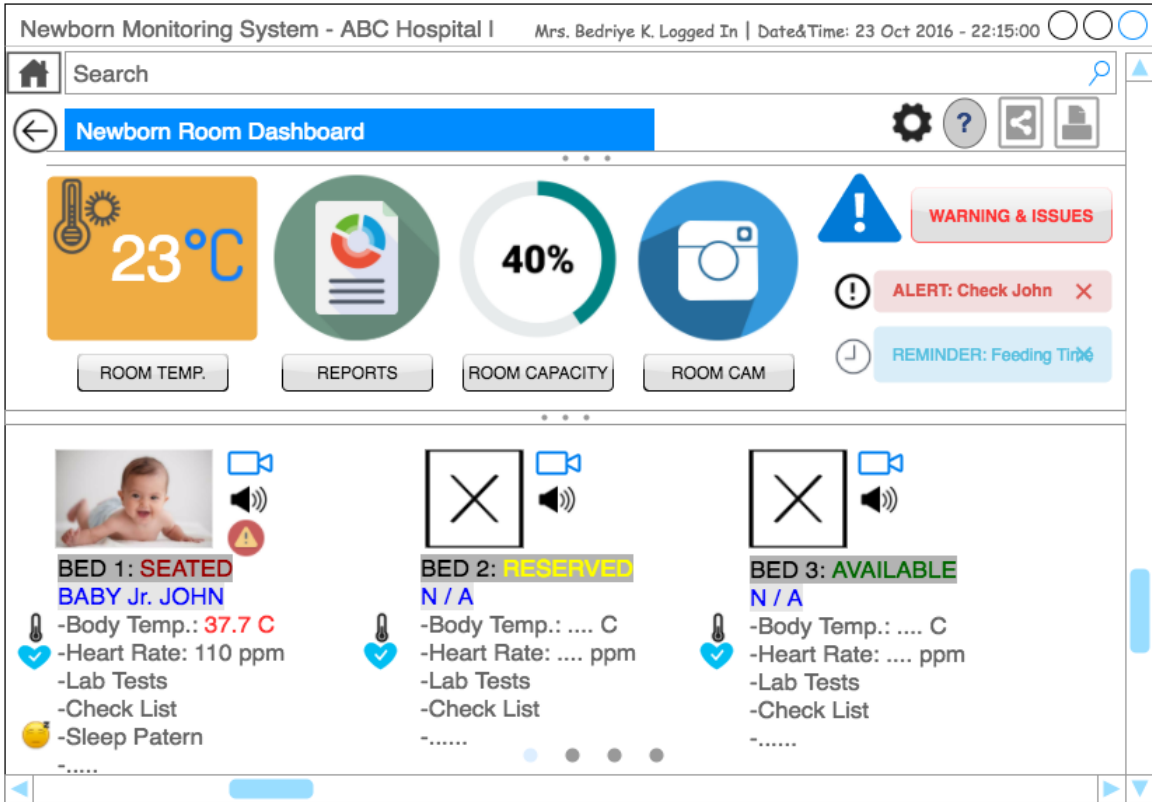
- ROOM CAPACITY
  - o Number of available Beds / Number of Beds (on room layout)
  - o Number of Babies
- ROOM TEMPERATURE
- ROOM CAM
- REPORTS
- BABY LIST (ON ROOM LAYOUT DESING)
  - o BABY DETAIL (For Selected Baby– Real Time Data – Recorded Data)
    - Settings button for each required function(Triggers-Alarms etc.)
    - Warnings-Follow Up and Up Coming Items
    - Body Temperature
    - Heart Rate(Beats)
    - Baby Bed Cam & Sound
    - Location / Map (Shows real time location on hospital layout)
    - Lab Tests Results
    - Doctor / Nurse Comments
    - Health Check List

WIREFRAMES (HAPPY PATH) ([BUILD LINK](#))

1- LOGIN



2- NEWBORN ROOM DASHBOARD




3- BABY DASHBOARD

Newborn Monitoring System - ABC Hospital | Mrs. Bedriye K. Logged In | Date&Time: 23 Oct 2016 - 22:15:00

Search

Baby John's Dashboard

 **37.7°C**

NAME : Jr. JOHN S.  
BIRTH DATE:.....  
FATHER: NAME  
MOTHER NAME:  
Other Info. Click Here

**HEALTH CHECKLIST COMPLETION % 95**


HEALTH CHECK LIST

**110 per min**

LAB RESULTS

**WARNINGS & FOLLOP UP & UPCOMING ITEMS**

ALERT: Body Temperature is over 37 C.



DEPARTMENT: NEWBORN  
FLOOR: 3  
ROOM: 301  
[Show Layout](#)  
[History](#)

DOCTOR & NURSE COMMENTS

CONTROL 1:  
CONTROL 2: