Health Technology Advances

Customer Experience

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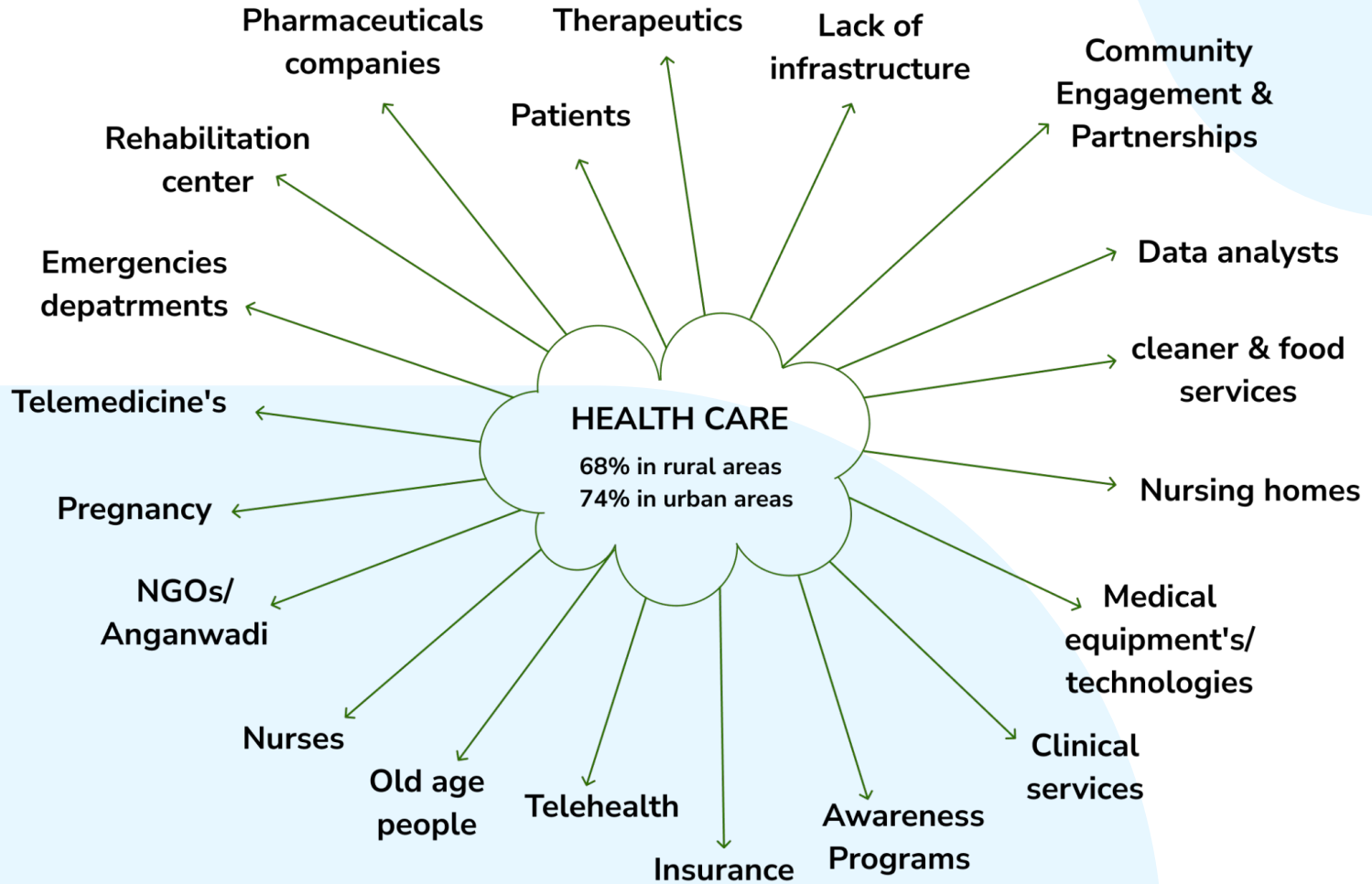
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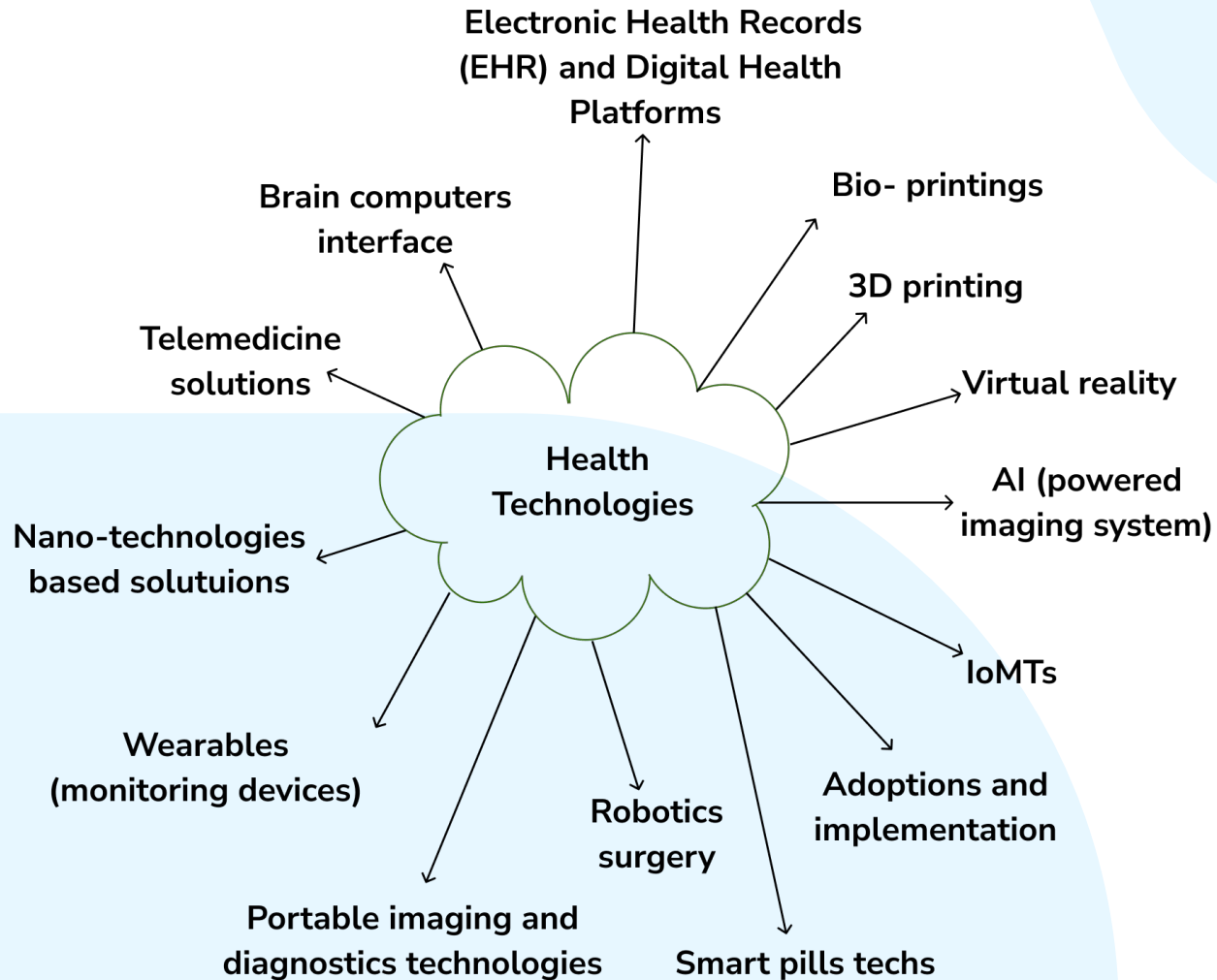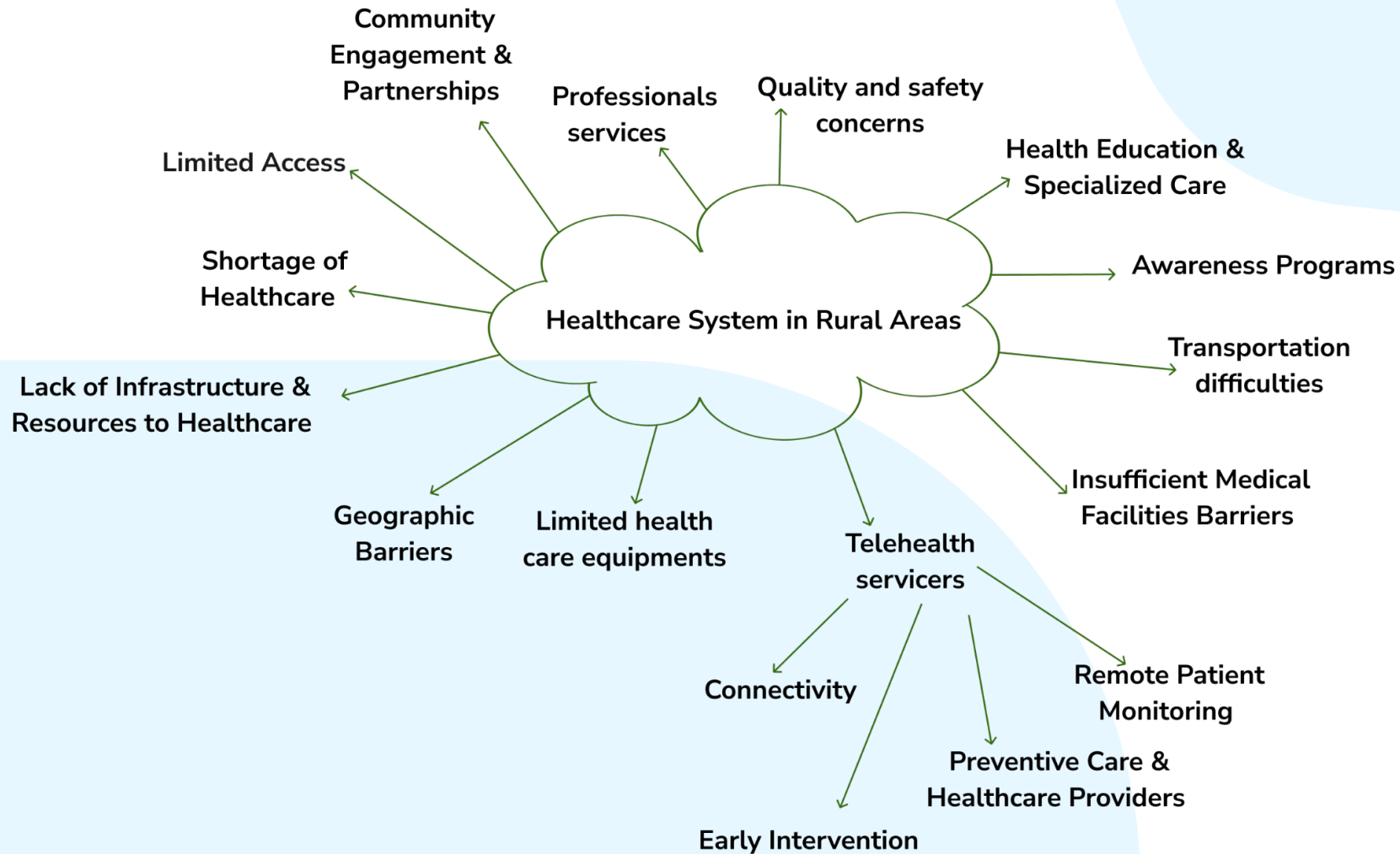
03

Health care system in Rural areas

Pharmaceuticals companies

Therapeutics

Lack of infrastructure

Community Engagement & Partnerships

Patients

Rehabilitation center

Data analysts

Emergencies depatrments

cleaner & food services

Telemedicine's

HEALTH CARE

68% in rural areas
74% in urban areas

Nursing homes

Pregnancy

NGOs/ Anganwadi

Medical equipment's/ technologies

Nurses

Clinical services

Old age people

Telehealth

Awareness Programs

Insurance

Success Rate

74%

IN URBAN AREAS

Use Telemedicine services

68%

IN RURAL AREAS

But don't know about it and their services.

Health Technologies

- Electronic Health Records (EHR) and Digital Health Platforms
- Bio- printings
- 3D printing
- Virtual reality
- AI (powered imaging system)
- IoMTs
- Adoptions and implementation
- Smart pills techs
- Robotics surgery
- Portable imaging and diagnostics technologies
- Wearables (monitoring devices)
- Nano-technologies based solutuions
- Telemedicine solutions
- Brain computers interface

Healthcare System in Rural Areas

- Community Engagement & Partnerships
- Professionals services
- Quality and safety concerns
- Limited Access
- Health Education & Specialized Care
- Shortage of Healthcare
- Awareness Programs
- Lack of Infrastructure & Resources to Healthcare
- Transportation difficulties
- Geographic Barriers
- Limited health care equipments
- Telehealth servicers
- Insufficient Medical Facilities Barriers
- Connectivity
- Remote Patient Monitoring
- Preventive Care & Healthcare Providers
- Early Intervention

Introduction

Welcome to a visionary project focused on elevating customer experience within the dynamic landscape of the health tech industry. Our mission is to empower users, enabling them to take charge of their well-being through the seamless integration of innovative technologies.

Healthcare system in India

80% of the total healthcare market. Hospital industry is expected to reach $132 bn by 2023 from $61.8 bn in 2017, growing at a CAGR of 16-17%.

The Indian health-tech industry is expected to grow $5 billion by 2023 and to $50 billion in another ten years

The Diagnostics industry in India is currently valued at $4 bn. The share of the organized sector is almost 25% in this segment (15% in labs and 10% in radiology).

The Indian Medical Tourism market is expected to grow from its current size of $3 bn to $7-8 bn by 2020

The market size of AYUSH has grown by 17% in 2014-20 to reach $18.1 bn and the industry is projected to reach $23.3 bn in 2022.

Health insurance contributes 20% to the non-life insurance business, making it the 2nd largest portfolio.

Healthcare in Rural areas of India

According to WHO 820 pregnant women died in Rural areas because of inaccessible health care system.
Almost 95% of all maternal deaths occurred in low and lower middle income countries - says "WHO".

To reduce the maternal and child mortality rates in rural areas, the government has launched a scheme to improve healthcare access. Under this scheme, primary health centers have been established in villages. These centers aim to provide essential healthcare services, maternal care, and child health services to the rural population. The initiative seeks to ensure that women and children in remote areas have access to quality healthcare facilities, leading to better health outcomes and a decrease in preventable deaths

In India, the public health system starts at the village level with ASHA (accredited social health activist) promoting health awareness, guiding family planning, and assisting pregnant women. The sub-center is managed by ANM (auxiliary nurse midwife) who conducts antenatal and child checkups, provides nutrition, and vaccinations. High-risk cases are referred to the primary health center where the Medical Officer (MO) provides treatment and conducts deliveries.

How Telehealth and telemedicine come at the surface.

In India, till now, there was no legislation or guidelines on the practice of telemedicine and the gaps in legislation and the uncertainty of rules posed a risk for both the doctors and their patients. However, in view of COVID-19 outbreak, the topic of telemedicine has suddenly taken a front seat.

In the past few years, ISRO's telemedicine network has come a long way. It has expanded to connect 45 remote and rural hospitals and 15 superspecialty hospitals. The remote nodes include the islands of Andaman and Nicobar and Lakshadweep, the hilly regions of Jammu and Kashmir, Medical College hospitals in Orissa, and some of the rural/district hospitals in other states.
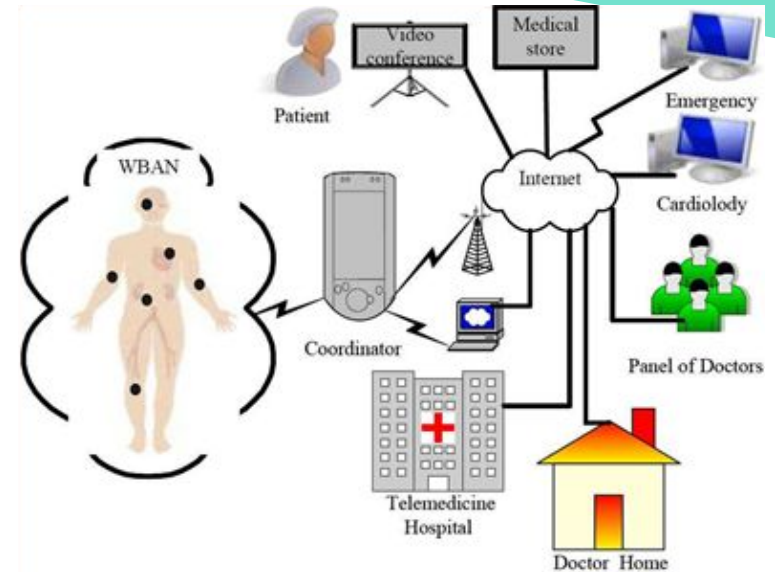
Infrastructure of telemedicine

Telehealth Background

Health related services via Electronics information and telecommunication technologies.

Telehealth allows long distance patients and clinical contact, care, advice, reminders, education, intervention, monitoring, and remote admissions.
Uses of an technologies that enables to store, analyze, and share information via patient portal management or mobile health application.

Helps in rural settings, lack or transportation and mobility, outbreaks conditions, in pandemics, decreased fundings, lack of staffs and access to care.

CONVENIENCE
65% using it.

SAFETY
63% it protect them from sick people

TIME SAVING
Like on video appointment, text messaging, etc.

Telehealth Background

Methods and Modalities

Healthcare providers commonly start telehealth by conducting a needs assessment, evaluating challenges that can be addressed through telehealth, such as reduced travel time, cost savings, or minimizing time off work. Collaborations with technology companies can facilitate a smooth transition.

Telehealth services can be delivered through four main methods: live video consultations (synchronous), store-and-forward transmission of medical data (asynchronous), remote patient monitoring, and mobile health solutions.
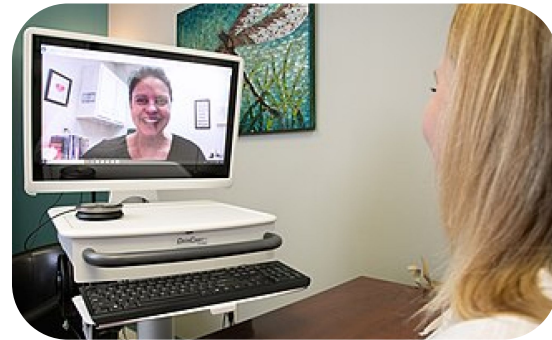
Telemedicine Background

Global historical perspective

Telemedicine is a term that covers the use of technology to deliver clinical care at a distance. It ensures that a person receives healthcare when needed, especially for those with limited access to care.

1985-mexico, used during massive destruction by earthquake by NASA

1988, during Soviet Armenia earthquake with casualties were more than 50,00, also used this technology to provide proper care to them.

Now in Modern times, sharing of medical data, real time audio and video consultation made it easy and stress free and cost effective.

Establishment of space center named " medical informatics and Technology app" at yale university in 1997

Telemedicine in India

In India, ISRO took step forward to established this technology. With them DIT, Ministry of External Affairs, Ministry of Health and Family Welfare and The State gov. Played a vital role in development of telemedicines services in India.

Successfully established services in India

Mammography services at SRI GANGA RAM hospital, Delhi.

Oncology at REGIONAL CANCER CENTER, Trivandrum

Gove. of UP practice telemedicines during the KUMBH mela's, there are Telemedicines vans equipped with video-conferencing system for visual communication.

Telehealth vs Telemedicine

Here we see that what is included in **Telehealth** and what in **Telemedicine**

Telehealth	Telemedicine
- remote interpretation of diagnostic tests - specialist review of records for expert opinion - consultation with a nutritionist or physical therapist Nonclinical services include: - provider training - administrative meetings - continuing medical education	- diagnostic testing - discussing medical history - monitoring

Telehealth encompasses a broader range compared to the telemedicine.

Telemedicine: refers specifically to remote clinical services

Telehealth includes:
- Provider training
- Administrative meetings
- Continuing medical education
- Clinical Services

MCH Background

Indian historical perspective

Maternal and Child Health (MCH) care is the health services provided to mothers (women in their child bearing age) and children. MCH is a package of comprehensive health care service designed to meet the promotive, preventive, curative, and rehabilitative needs of pregnant women before, during, and after delivery.

Madras state was the first to establish a separate Maternal Welfare section in 1931.

In 1946, the Bhore Committee recommended the integration of MCH but implementation occurred after 1955.

In 1968, the Committee on Child Welfare Programs associated successful family planning (FP) with good MCH services.

1974 was a pivotal year. India established a National Policy for Children and a Children's Board.

Maternal child Health Program

MCH

In India, MCH was firstly initiated in early 1900s. MCH was voluntary work coordinated by the **Maternal and Child Welfare Bureau** under the **Indian Red Cross Society. WHO** and **UNICEF** support contributed to the expansion of MCH service.

According to WHO

Most maternal deaths are preventable, as the health-care solutions to prevent or manage complications are well known. All women need access to high quality care in pregnancy, and during and after childbirth. Maternal health and newborn health are closely linked. It is particularly important that all births are attended by skilled health professionals, as timely management and treatment can make the difference between life and death for the mother as well as for the newborn. According to **WHO** there is a **SDG** target to reduce the **Maternal mortality ratio** to less than 70 per 1,00,000 live births by 2030. In India some of the states already achieved this target which are as follows:-

Indian states which already achieved the SDG target

Kerala (19)
Maharashtra (33)
Telangana (43)
Andhra Pradesh (45)
Tamil Nadu (54)
Jharkhand (56)
Gujarat (57)
Karnataka (69).
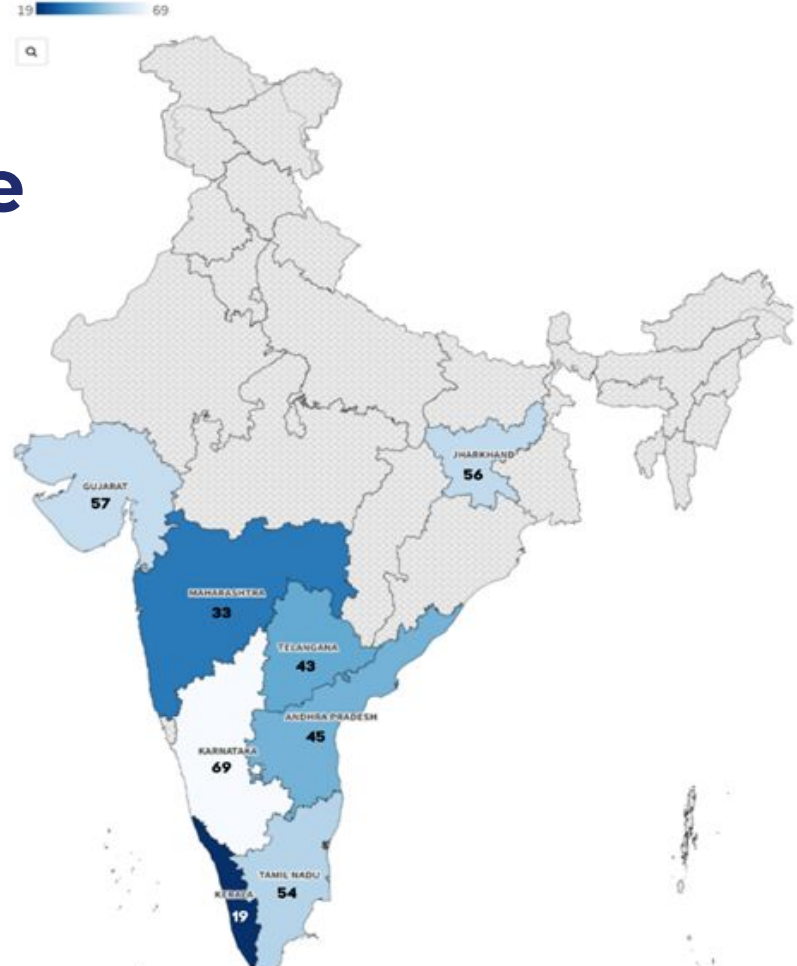
Objectives of MCH

- Provide basic health care to all mothers and children.
- Reduce maternal mortality and morbidity.
- Reduce prenatal and neonatal mortality and morbidity.
- Prevent malnutrition.
- Prevent communicable diseases.
- Promoting reproductive health.
- Regulate fertility so that desired and healthy children can be born when desired.
- Ensure the birth of a healthy child.
- Encourage healthy growth and development.

Importance of MCH

- It aids in the delivery of a healthy baby by providing immunization services, guaranteeing a balanced diet, and maintaining sanitation.
- It safeguards reproductive rights and promotes a happy life.
- It ensures the health of both mother and child.
- It helps to reduce the preventable deaths among women and children.

Mobile Kunji

Mobile Kunji is a multimedia job aid designed for frontline workers (FLWs) in India to improve their counseling sessions with families during pregnancy and postnatal care. It consists of color-coded cards resembling mobile phones, each with illustrations and key messages for specific stages of pregnancy or postnatal care. FLWs dial a unique shortcode on their mobile phones, playing pre-recorded audio content delivered by a fictional doctor character, Dr. Anita. This standardized approach reduces inconsistency and improves interpersonal communication. The use of a doctor representation enhances credibility and authority, benefiting FLWs in their interactions with families.

Where Mobile Kunji lacking

- Interactive Engagement: The Mobile Kunji service primarily relies on interactive voice response (IVR) technology, which may pose challenges for individuals with limited literacy or language barriers. Expanding the service to include SMS-based interactions or incorporating visual elements could enhance engagement and accessibility for a wider range of users.
- Personalization: The Mobile Kunji service could benefit from greater personalization based on the specific needs and circumstances of the pregnant women using the service. Tailoring the content and messages based on the user's gestational age, geographic location, or individual health concerns could provide more relevant and targeted information.
- Localization: While the Mobile Kunji service aims to reach users across different regions in India, further localization efforts could be made to ensure the content and language align with the specific cultural contexts and linguistic diversity of various communities. This would help improve comprehension and engagement with the information provided.
- It is only in bihar

Research and Case studies

In one case studies, they talk about the african city kenya, where in rural areas pregnant women are not able to travel far coz lack of transportation,so **The Philips Foundation,** together with local **clinical partners and the Ministry of Health,** is working to put **portable ultrasound** into the hands of **trained midwives at primary care facilities** and **connect these midwives to specialists** in urban hospitals.

Through a combination of in-person training, remote education, and real-time video collaboration, midwives can build the skills and confidence required to perform routine basic obstetric screenings. They can identify high-risk women for timely referral and treatment and give these pregnant women a much better chance of bringing a healthy child into the world.
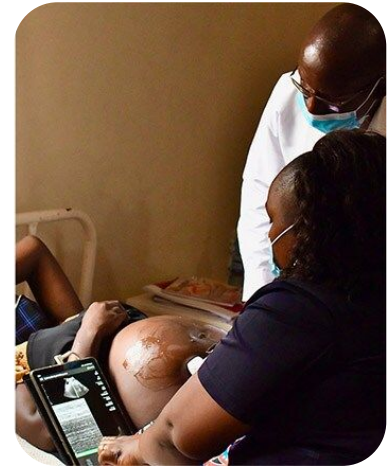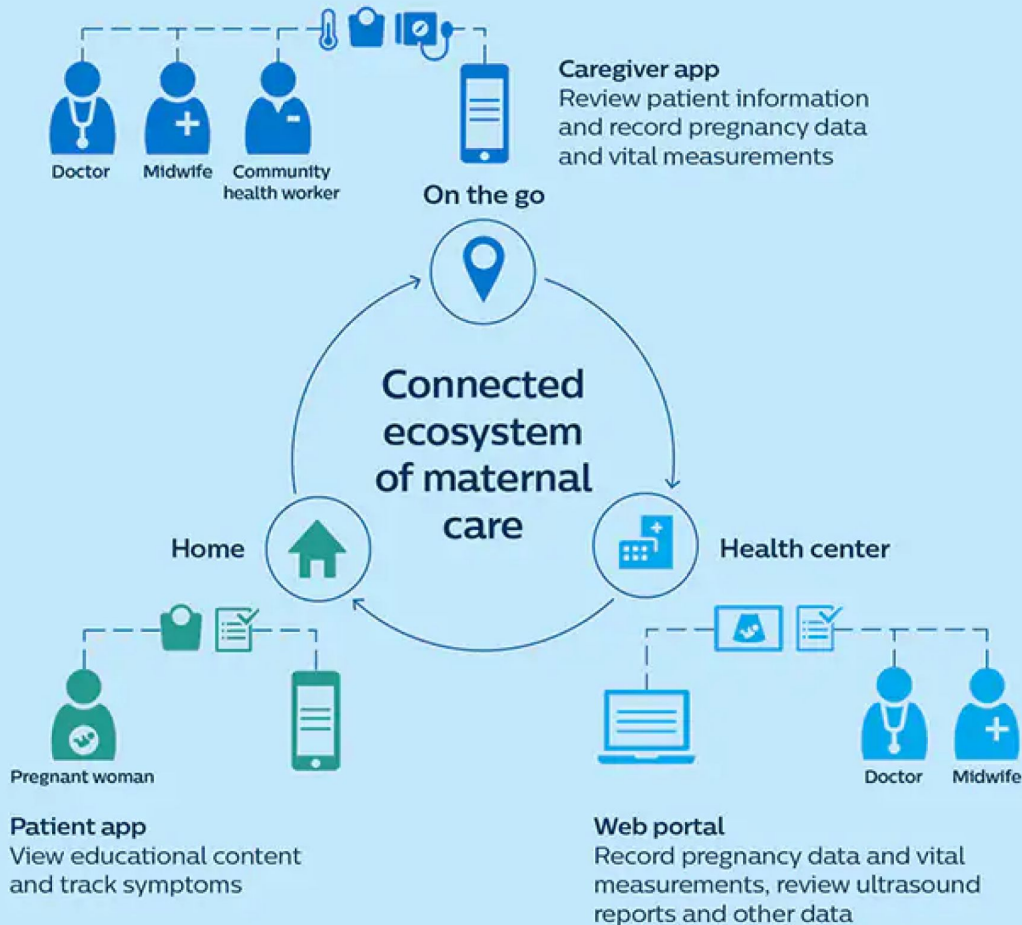
This is the visual representation of telemedicine ecosystem that how it work. This is the how it works in urban areas.

Secondary Research Analysis

- There are different schemes and programmes related to pregnant womens in rural areas.

- Telehealth and telemedicine still untouched to rural people.

- Technologies are still needs professionals.

- Asha workers and anganwadi is the major link between rural people and hospitals.

- Pregnancy needs more attention and regular check ups to maintain their body + mental health.

PRIMARY RESEARCH

Major Stakeholder who are the part of this Ecosystem

Midwives/Asha workers

Rural people

Doctor - Anchal
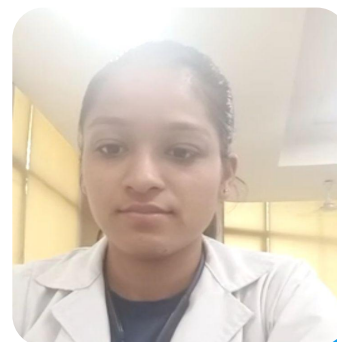
Basic Questionnaire that we asked to urban people to understand the context of health services

1. Have you ever came across the word TELEMEDICINES which is now gaining the foothold all over the world?
2. How frequently do you use telemedicine services for your healthcare needs?
3. Which specific telemedicine platforms or apps have you used in the past? Please list them.
4. Did you encounter any technical difficulties or glitches while using telemedicine platforms? If yes, please describe your experience.
5. Do you feel that telemedicine consultations provide the same level of personal connection with healthcare providers as in-person visits? Please explain your response.
6. Do you believe that telemedicine has improved your access to healthcare services? Please provide examples or reasons for your response.
7. How would you rate the availability and responsiveness of healthcare professionals on telemedicine platforms?
8. How likely are you to continue using telemedicine services in the future?
9. If there is anything else that you think we missed in this Questionnaire or you would like share your some other experiences. please do share it would helps us to move forward in right directions.

Questionnaire for rural women

1. Are you currently pregnant or have you been pregnant in the past year?
2. How accessible is prenatal care in your area?
3. Have you ever used a mobile health app or telemedicine platform to seek medical advice or consultation during your pregnancy?
4. If you have used a mobile health app or telemedicine platform, how satisfied were you with the experience?
5. What challenges do you face in accessing prenatal care services in your area?
6. Are you aware of any wearable devices or remote monitoring tools that can help track your health during pregnancy?
7. Would you be interested in receiving health-related educational content (videos, text messages) on topics related to pregnancy, childbirth, and postnatal care?
8. How do you currently access important medical supplies during your pregnancy?
9. Do you have access to the internet or smartphones?
10. How would you feel about receiving personalized health tips and reminders through mobile apps or SMS based on your specific needs during pregnancy?

Insight from Rural Women

- There is lack of resources available in the PHC.

- They doesn't have proper and accurate information regarding the checkups and govt. schemes.

- The ANMS/Nurses which are in the PHC are not enough trained or experienced.

- They have to go outside from their area for the checkups.

- They rely on their sms received on their mobile phones.

Questionnaire for Asha workers

1. How you collect and update the data of the pregnant women?
2. What methods do you use to promote MCH awareness among community members?
3. In your experience, what are the primary challenges faced by pregnant women in accessing healthcare services?
4. How do you facilitate referrals of pregnant women to healthcare centers for specialized care, if needed?
5. How do you help the pregnant ladies in the context of medicine and other basic equipment?
6. Are you familiar to run a tech machine for the basic checkup of the pregnant ladies?
7. What basic machines are available in PHC for their checkup?

Insights from Asha workers

- Asha workers make sure that each pregnancy should be registered and updated and after registration they provide the MCR card (Mother child care) and MCP card (Mother child protection).

- In every PHC there is one labour room is necessary.

- Regular camps and remote health vans are available for educating them and also provide basic medicines.

- They provide a small pregnancy kit to pregnant women for their care and hygiene.

- They don't know how to run some basic equipment which needs little more experience in it.

- No ultrasound machines is available in near ny PHC.

- Rural ladies get engaged to them because of easy to get access in hospitals through them and also get some incentives for their pregnancy.
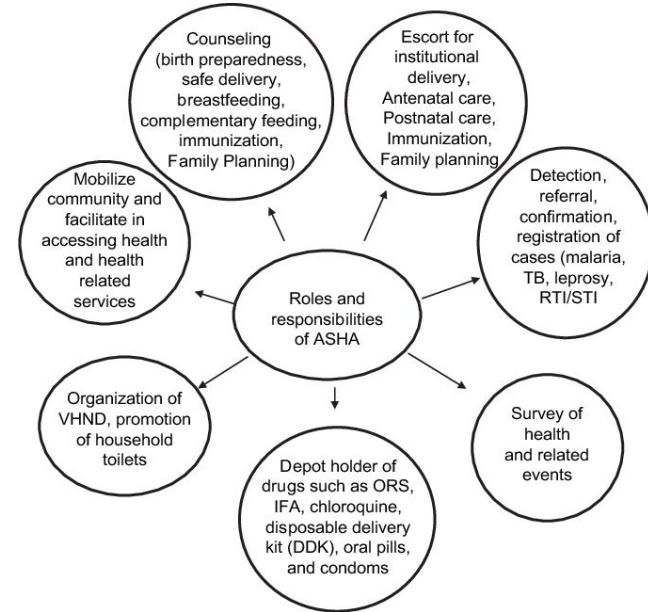
Questionnaire for Doctors

1. What is your experience while examining the pregnant women who lives in rural areas?
2. What are the common health issues or challenges that pregnant women in these rural areas face during their pregnancies?
3. During your visits, have you observed pregnant women using mobile health apps or telemedicine platforms to seek medical advice or consultations?
4. In your opinion, how can technology (e.g., telemedicine, mobile apps) assist in improving healthcare services and the overall experience for pregnant women in rural areas?
5. Do you believe introducing wearable devices or remote monitoring tools could positively impact the healthcare of pregnant women in rural areas? Please share your thoughts.
6. How do you provide health education to pregnant women and their families during these health camps or visits? Are there any challenges in conveying health-related information effectively?
7. What are the most common medical supplies or medications required for pregnant women during your health camps? Do you face any challenges in ensuring their availability?
8. How do you think technology can help in providing personalized health tips and reminders to pregnant women based on their specific needs during their pregnancies? Can this be integrated into your healthcare services?
9. Are there any specific technological tools or resources you believe would significantly improve the effectiveness of your healthcare services during these camps or visits?

Insights from Doctors

Miss. Anchal (Gynecologist)

Asha workers make sure that each pregnancy should be registered and updated and after registration they provide the MCR card (Mother child care) and MCP card (Mother child protection).

In every PHC there is one labour room is necessary.

Regular camps and remote health vans are available for educating them and also provide basic medicines.

Dr. Anchal told us the crucial roles played by all employees within the ecosystem, making the task of removing anyone from this interconnected network challenging and arduous. Additionally, she pointed out that limited resources at Anaganwadi or primary health centers can lead to problems among pregnant women who are compelled to seek checkups outside their local area.

What is ANTENATAL tests included ?

Antenatal care includes **general examination, abdominal examination, vaginal examination, regular tests** to monitor the progress of the pregnancy, ultrasound scanning, checks of weight gain, blood checks, tests of HORMONES and ENZYMES to assess the efficiency of the PLACENTA, and frequent tests of the blood pressure and urine.

Factors Consider

We found out that, in rural area there is chain which is interlinked to each other. This system work like a ecosystem because you can not remove any stakeholder from that.

Most of the women depends on these asha workers and their husband for checkups and transportation.

There are primary health care near villages and their area where they can easily get tested, which are basic.

In PHC there will be Mo and nurse who run these tests and provide some basic medicines to them such as- iron folic acid, vitamins, and injections to protect the baby from any diseases.

Technologies available in Rural areas

HB machine
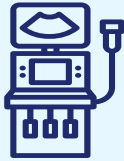
To check the oxygen level and blood flow in the patients.

BP machines

To check blood pressure

Weighting

Checking the weight of the patient

These are some of the challenges faced by the women in rural areas

- Limited access to health care services.
- Transportation issue.
- Lack of education.
- Healthcare provider shortage.
- Distance to facilities.
- Lack of support system.
- Lack of health tech machines for checkup.

Note:- In India, there is a significant healthcare imbalance, with only one doctor available to serve every 1,000 patients. Reports indicate a pressing need for the addition of 1,000 doctors and 3,000 nurses to address this critical shortage.

Stakeholder map

Core Stakeholder

- ASHA workers
- Pregnant Women

Indirect Stakeholder

- Doctors
- Govt. Policies
- General staff
- NGOs

- Primary health centers
- ANMS/Nurses
- Anganwadi Worker

Direct Stakeholder
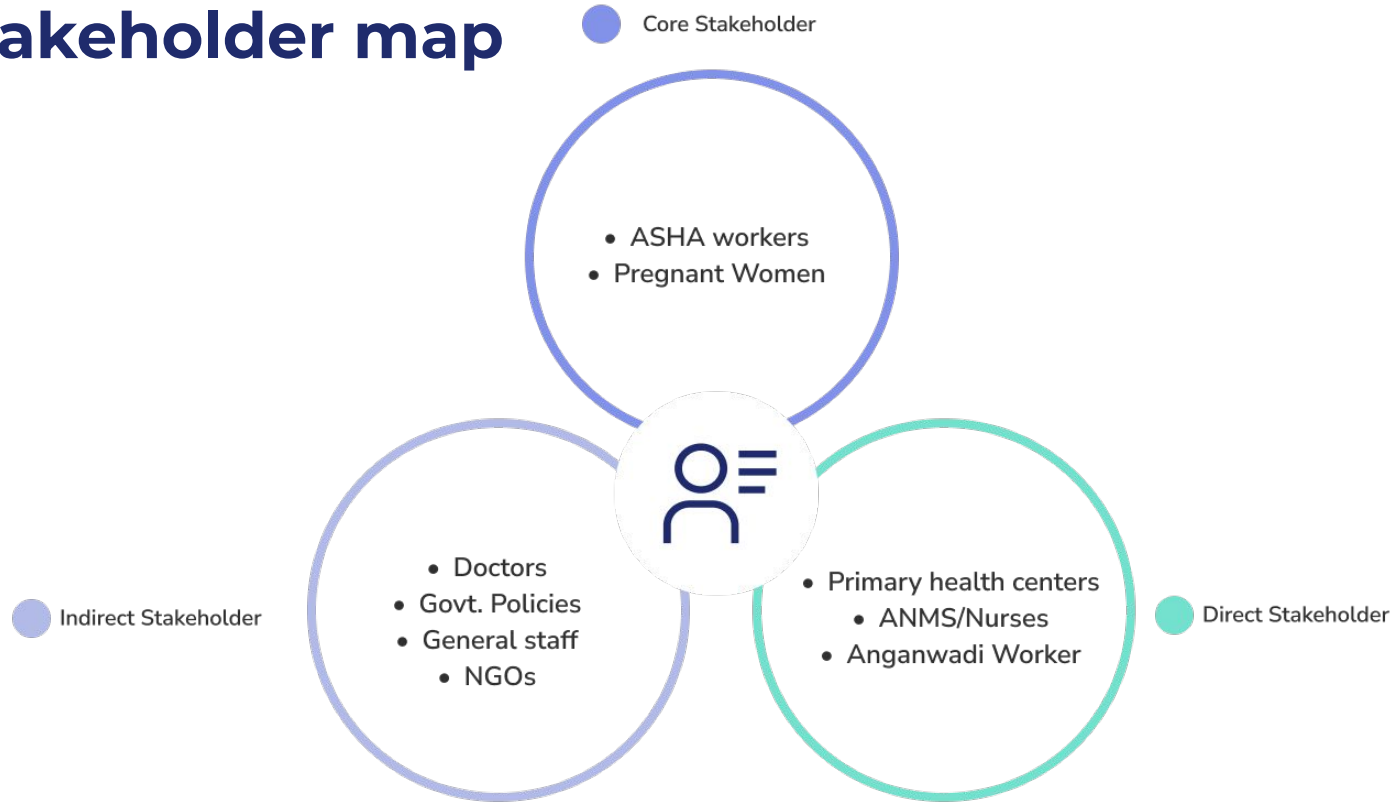
User Journey Map

	ASHA Worker contact them	Go to Anganwadi	Taken to the PHC	Got treated	Get back to the home
Happy	🙂			🙂	🙂
Neutral		😐			
Unhappy			☹️		
Experience/ Pain Points	• ASHA worker record and monitor their data. • They get to know about many govt. schemes by which they get incentives during their pregnancy.	• Lack of information received. • They need to visit the nearby PHC from their area for a checkup.	• Lack of resources. • Lack of experienced ANM for checkup. • They have to go outside from their for any specific checkup.	• They get treatment in less and affordable money. • Doctors treat them equally.	• They get back to their home after the treatment in an ambulance. • They are happy to see their baby healthy and safe.
Area of work	• Get proper information. • Get the necessary equipment for their normal checkup.		• Some digital equipment might be there.	• Proper resources should be provided for their health checkup.	

Persona

Dr. Ayesha Gupta

Motherly Angel (Rural doctor)

ABOUT

Age: 35 Yrs.
Doctor and MCH Program Coordinator

BIO

Dr. Ayesha Gupta is a dedicated doctor with a strong focus on maternal and child health (MCH) programs in India. With several years of experience in public health and a deep understanding of the challenges faced in MCH, she has taken on the role of MCH Program Coordinator to drive impactful change. Dr. Gupta has a passion for improving the health and well-being of mothers and children in underserved communities.

GOALS

- Access to quality care
- Empowering local communities
- Policy Advocacy

FRUSTRATIONS

- Limited Resources
- Cultural and Social barriers
- Inadequate Training and Support
- Data Management Challenges

MOTIVATIONS

- Dr. Gupta is committed to reducing maternal and child mortality rates in India.
- Dr. Gupta is motivated to bridge the healthcare disparities that exist in her community.

Neha Patel

Health Guardian (lives in sector 3A, Gurugram)

ABOUT

Age: 40yrs
Accredited Social Health Activist (ASHA)
Worker

BIO

Neha Patel is a dedicated and compassionate Accredited Social Health Activist (ASHA) worker. Growing up in a close-knit community, she understands the unique healthcare challenges faced by families in her village. She is the frontline healthcare worker who acts as a bridge between the healthcare system and the villagers. Neha is responsible for identifying pregnant women and newborns in her village and providing them with essential health services, education, and support.

GOALS

- Improve Maternal health
- Enhance child health
- Community engagement
- Empowerment through education

FRUSTRATIONS

- Limited Resources
- Cultural and Social barriers
- Inadequate Training and Support
- Data Management Challenges

MOTIVATIONS

- She is motivated by the desire to reduce maternal and child mortality rates.
- Neha firmly believes that the health of mothers and children lays the foundation for a healthier and more prosperous community in the long run.

Persona

Ananya Patel

Nurturing Soul (labor class family)

ABOUT

Age: 28yrs
Very careful for her first delivery

BIO

Ananya Patel is a 28-year-old woman living in a rural village in India. She comes from a low-income family and has limited access to healthcare resources. Ananya is currently pregnant with her first child and is seeking support and information to ensure a healthy pregnancy and safe delivery. She is motivated to provide the best possible care for herself and her unborn baby but faces numerous challenges due to her rural location.

TRAITS

Supportive   Attentive   Resilient

GOALS

- Healthy pregnancy
- Safe delivery
- Financial Preparedness
- Access to information

FRUSTRATIONS

- Lack of information
- Limited access to Healthcare
- Financial Constraints
- Language and Cultural barriers

MOTIVATIONS

- Ananya feels a strong sense of responsibility towards her unborn child.
- Ananya is inspired by the sense of community and support.
- Ananya's deep love and care for her unborn baby serve as a powerful motivation.

Empathy map

THINK

- How can I overcome the challenges of accessing healthcare in our rural village?
- Are the things I hear from others about pregnancy accurate?

SEE

- Observe the importance of prenatal care in her community.
- Notices the limited healthcare resources for pregnant women.

HEAR

- Listen to stories and experiences from other women in the village.
- Receive advice from family and **ASHA** workers.

SAY

- I need access to proper healthcare and reliable information.
- I want to ensure the best for my baby and myself during this journey.
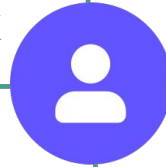
Primary Research Analysis

- There is an ecosystem in which each and everything related to each other.
  - I.e- Rural ladies-asha workers-anganwadi-Phc nurses-Specialist doctors.

- Lack of knowledge about technologies and their use.

- Asha workers are the biggest support to rural pregnant ladies

- Lack of resources, but they do provide them pregnancy kit with some medicines, bandages, vitamins and condoms in it.

- Doctors understand them but sometimes language became barrier.
- Orthodox mindset.

- Pregnant women do get incentives from the gov. during their pregnancy till delivery or some time after delivery for child health and care.

Problem Statement

- Lack of resources in nearby PRIMARY HEALTH CENTERS.

- People with no knowledge about running high tech machines.

- Running towards big hospitals for basic health checkups and antenatal tests.

- They depends on asha workers and on their husband for checkups.

How Might We

Develop a smart system that analyzes health data and provides personalized tips and reminders to pregnant women based on their specific needs, making it easier for them to stay on track with their antenatal care routine?

Can enhance the customer experience of the rural pregnant womens in their medical tests and their medicine during their pregnancy

Utilize technology to enhance the customer experience for pregnant women in rural areas of India, ensuring accessible, personalized, and quality prenatal care?

How might we leverage mobile health apps and telemedicine platforms to connect pregnant women in rural India with qualified healthcare professionals, ensuring timely consultations and personalized antenatal care?

Final How Might We
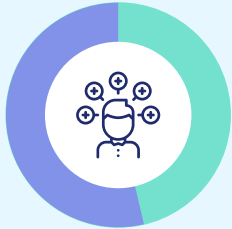
How might we implement an intuitive and easy-in-use system, to ensure a seamless medical tests and also based on their special needs in their antenatal care routine for rural pregnant women?

Feature List

- **Haemoglobin count-** Devices which can easily count Hb in blood with an ease.
- **Fetal monitoring**
- **Temperature monitoring and Skin texture detection for other diseases**
- **Get to know about the tests**
- **Easy access to medical reports**
- **Easy access to emergency service**
- **Nearby Pharmacy details**
- **Appointment booking**
- **Voice assistant**
- **Gesture reading AI and give output effectively**
- **Medical Tutorials, training, and other home remedies type of knowledge can be given**
- **One solution for all blood tests**
- **Portable easy carrying ultrasonography machine**
- **Reminders related to their tests, medicines, app**

Ideations

- We can add a **digital screen on weighing machine** so that in the weighing machine it can calculate their iron and other basic things and tell them where they have to improve or for which they have to take medicine.

- **Server based application**- it make an ecosystem for womens which connect them through it to their Midwives and doctors and also provide informations related to their nearest hospitals and clinics, Pharmacy (medical shop).

- **Mobile ultrasound units with trained operators** and also trainers which reach out them to facilitate pregnancy check-ups.

- **We can send them SMS/messages** related to their medicine and health checkups on the time to remind them.
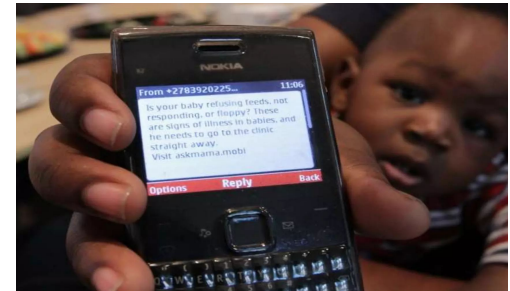
Ideations

- **Telemedicines vans** loaded with high tech machines.

- **Chip based wearable ring** which can change its color or give some kind of vibrations at the time of any risk or emergency or at the time of major tests .

- **Chip based Blood sampling patches** or **also it can also detects the person with any diseases without any diagnostic laboratories** for anemia tests and also for PUBS test (to check abnormalities in fetal problems during pregnancy).
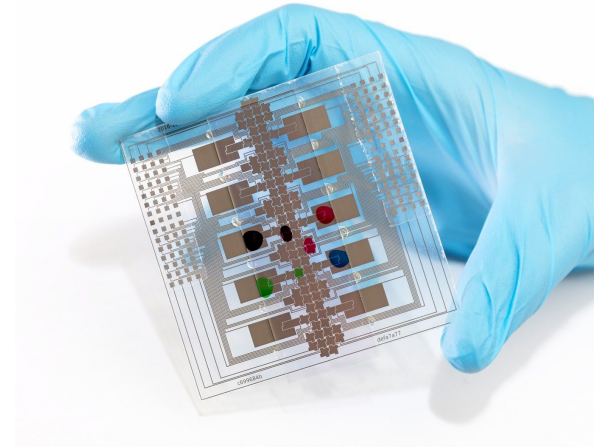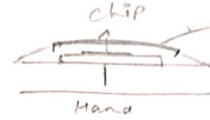
Ideations

- **Kiosk machines in phc** with ai implemented functions which helps anms to do checkups effortlessly and efficiently, with tag cards for their understanding.

Ideations

- **Automated monitoring sensory suites** which helps to do tests and can also give therapy to them.

Ideations

- **AI-powered Remote Fetal Monitoring:** Develop AI algorithms that analyze fetal heartbeats captured through simple handheld devices and record it. This could enable pregnant women to monitor their baby's health at home and share the data with healthcare professionals when necessary.
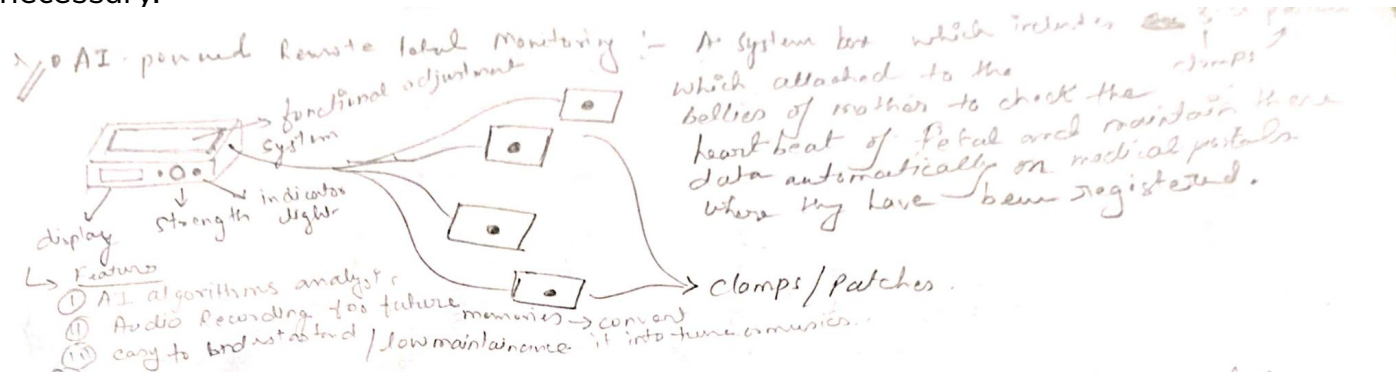
- **Portable blood testing device-** this device can help nurses and lab assistants to do blood tests fast and efficiently. They just have to take out pin point size of blood and put it on the slide and insert it under the device with few clicks, it can give fast results and can also give informations related to the problems.

Ideations

- **Mobile ultrasound units with trained operators** and also trainers which reach out them to facilitate pregnancy check-ups.
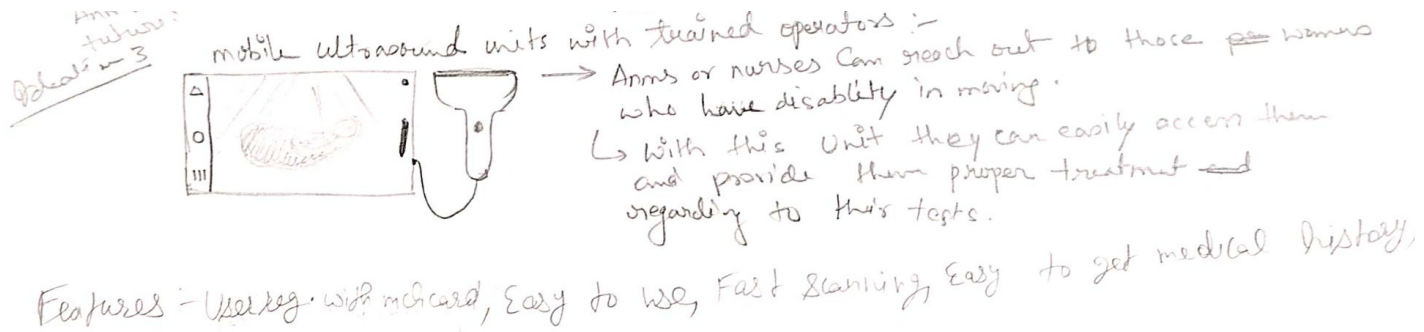
There will be portable device which will be connected with a mobile device and it will scan and show an ultrasound in the mobile device. The ultrasound report can be printed as well as shared from the mobile device.

Ideations

- **Eco-friendly medical kits-** which also include the pain reliever "TENS" type equipments.
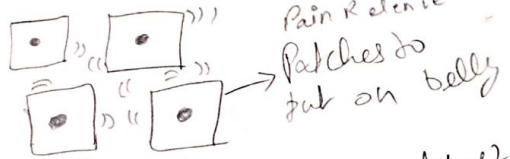
To relieve the cramp pain there will be adjustable patches which will be pt on their bellies and there will be a controller for this patches to control their vibrations and other functions.
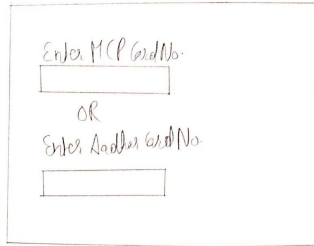
Ideations

- **Assistive Technology for Disabled Pregnant Women:** Develop assistive technologies tailored for pregnant women with disabilities, such as mobility aids with pregnancy-specific adaptations and devices to aid in prenatal care for women with visual or hearing impairments.

Final Ideation

- **Mobile ultrasound units with trained operators** and also trainers which reach out them to facilitate pregnancy check-ups.
- **Portable blood testing device-** this device can help nurses and lab assistants to do blood tests fast and efficiently. They just have to take out pin point size of blood and put it on the slide and insert it under the device with few clicks, it can give fast results and can also give informations related to the problems.
- **We can send them SMS/messages** related to their medicine and health checkups on the time to remind them.

Feature list
Fetal monitoring
Blood tests all basic and regular
SMS reminders

Low fidelity wireframes

1

Home Screen

Both options are given because
in the PHC normal patient
can also come rather than a
pregnant women so the test will
be done through Aadhar Card No.

About the patient

Option to see the history
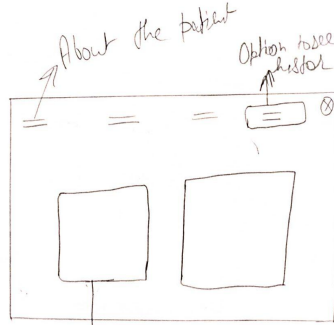
Screen for choosing test

Option of different tests

2

Different types of tests

Next button

Test type screen

On this screen Anm/nurses can
choose between the different types
of tests which should be done
so that there is a range
of the tests to choose.

Details

3

Report Details

Past report Details

Print button

Button to update on the MCH Portal

Report Screen

After the test this screen will appears
where the patient current reports and
past report will be shown and there is
a button to update the report on the MCH
portal

Strategy Design Product: Portable Health Checkup Device for Remote Areas

Accessibility and Ease of Use

Work on a sustainable business model that includes affordable pricing or government subsidies.

Data Management

Develop a secure cloud-based platform to store and manage patient data.

Design and Engineering

Ensure the device is lightweight, durable, and can withstand varying environmental conditions.

Care Natal

Training and Deployment

Provide comprehensive training to healthcare workers and local medical personnel on using the device.

. Technological Development

Develop the blood testing ultrasound technology for reliable module to accurately analyze key health indicators.

Monitoring and Feedback

Regularly analyze data to identify usage patterns and areas for enhancement.

Sustainability and Scalability

Work on a sustainable business model that includes affordable pricing or government subsidies.

Community Engagement

Collaboration with local health leaders or an organization to promote the product,

User flow Scenario: Monthly test Radha's Journey to Motherhood

Step 1: Finding out the Pregnancy,

Radha and her husband, Ravi, were excited to start a family. Radha took a pregnancy test and discovered that she was pregnant! Overwhelmed with joy, they decided to visit their local Anganwadi center to seek guidance on the next steps.

Step 2: Visit to Anganwadi Center

where they met the Asha workers. The Asha workers congratulated Radha and provided her with information about various maternal and child health programs offered by the government. They also explained the importance of regular check-ups during pregnancy for the health of both the mother and the baby.

Step 3: Visiting the Primary Health Center (PHC)

Following the advice of the Asha workers, Radha made an appointment at the nearby Primary Health Center (PHC) for her first antenatal check-up. At the PHC, a healthcare professional conducted a thorough examination of Radha, including a physical check-up, blood pressure measurement, and asked about her medical history.

Step 4: Basic and Monthly Tests During her first visit
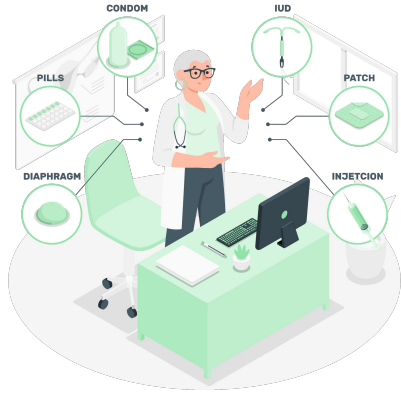
to the PHC, Radha underwent some basic tests like blood tests, urine tests, and a sonogram to determine the gestational age of her baby. The doctor also provided her with a schedule for monthly check-ups and important vaccinations to ensure a healthy pregnancy.

Step 5: Video Consultation with a Doctor

For some of Radha's subsequent check-ups, did video consultations with doctors. This was especially helpful for women who had difficulty traveling to the health center regularly. Radha found this option convenient and availed of it for one of her follow-up appointments.

Step 6: Assurance and Reporting on MCH Portal

The video consultation, Radha was able to discuss her concerns and get reassurance from the doctor regarding her pregnancy. The doctor reviewed her test reports, answered her questions, and provided valuable advice for a healthy pregnancy.

The doctor updated Radha's medical records,

Following the consultation, the doctor updated Radha's medical records, including test reports and observations, on a Maternal and Child Health (MCH) portal. This portal allowed Radha and her doctor to have easy access to her health records, making it convenient for monitoring her progress throughout the pregnancy.

Step 7: Regular Check-ups and Preparing for Motherhood

As the months passed, Radha diligently attended her monthly check-ups at the PHC and followed the doctor's advice on nutrition and exercises. The Asha workers continued to provide support and guidance throughout her pregnancy journey.

Step 8: Welcoming the Baby After a healthy pregnancy,

Radha gave birth to a beautiful baby boy.

For First time users and appointment booking and also scout them to PHC and hospitals

Anganwadi workers

Asha workers
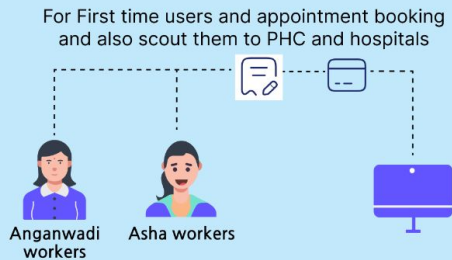
Review patient information and runs some basic tests including ultrasonography, and Blood test also vaginal test if necessary. Record pregnancy data and vital measurements and update it on portal

Online consultation is done there.

Anganwadi

PHC

Connected Ecosystem of maternal care in Rural Area

Home

Gov. Hospital

Reminders

Doctors

Appointment needed

Pregnant women

Phone
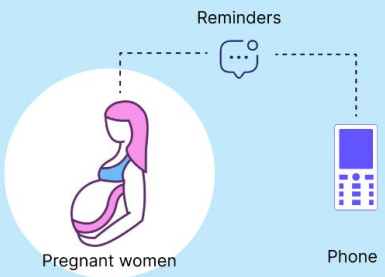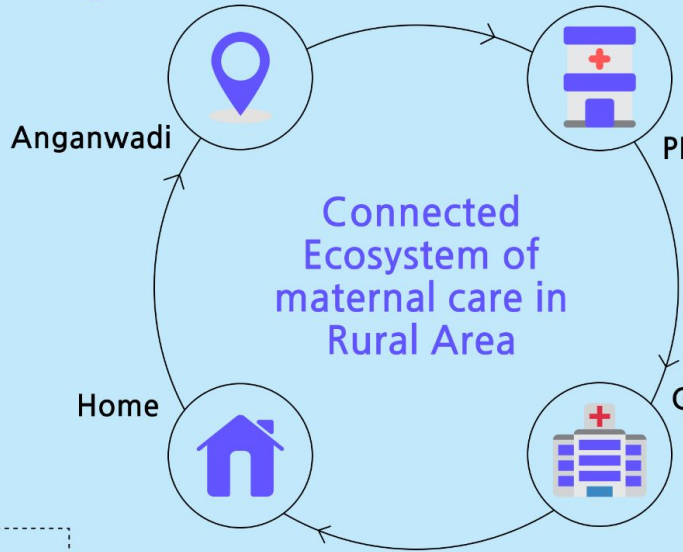
MCH Sms reminder related to their appointments, medicines, checkups, and reports updates.

Online consultation is done there or if any emergency situation or for physical consultation appoint would be booked.
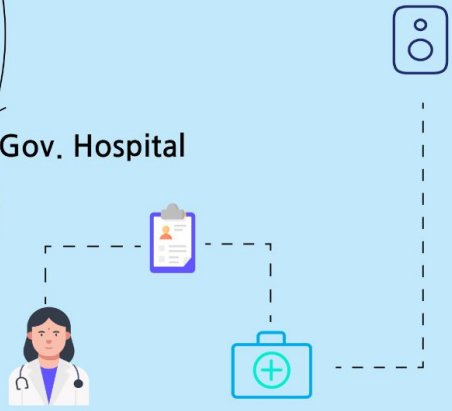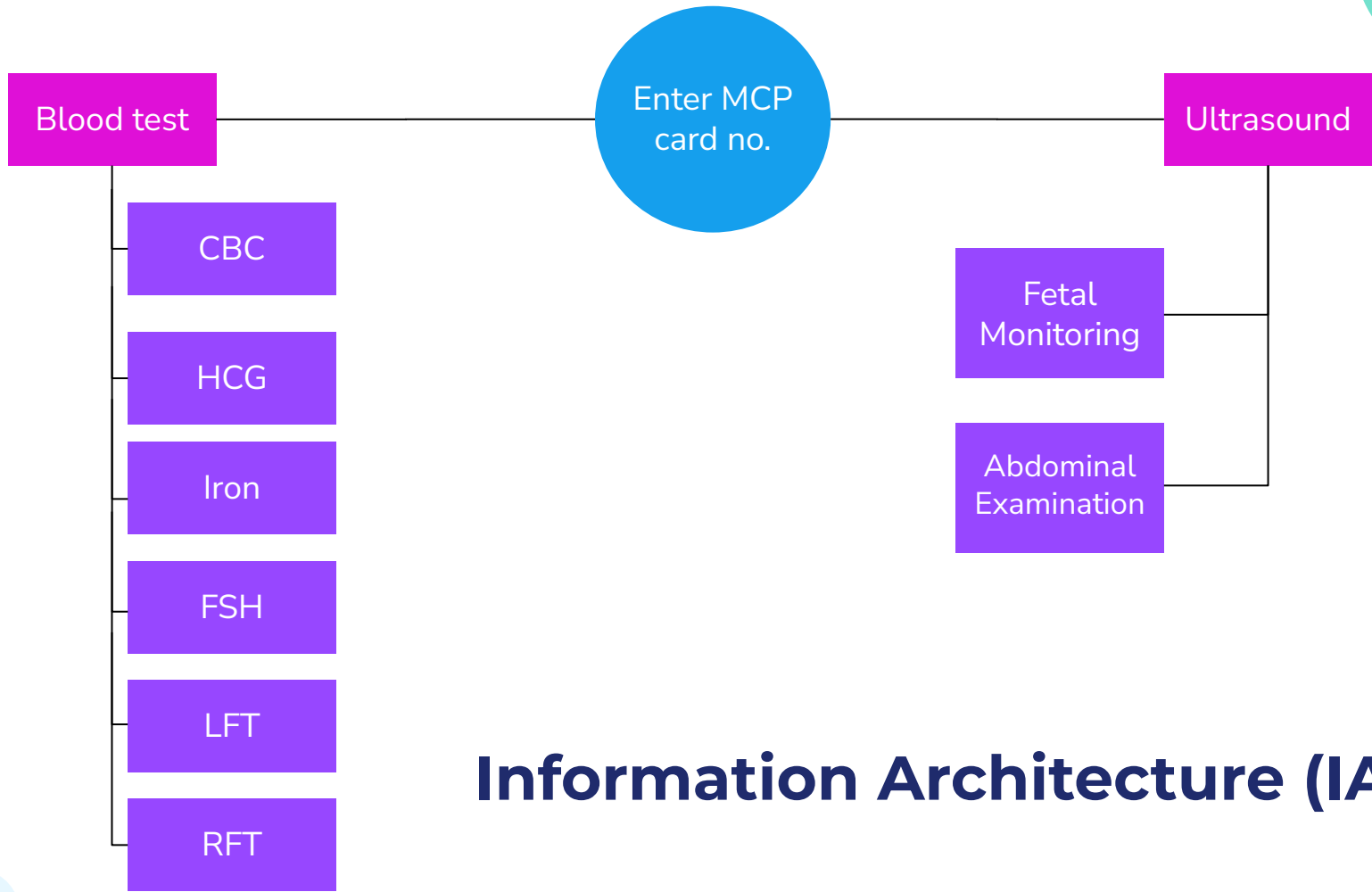
Information Architecture (IA)

Task Flow
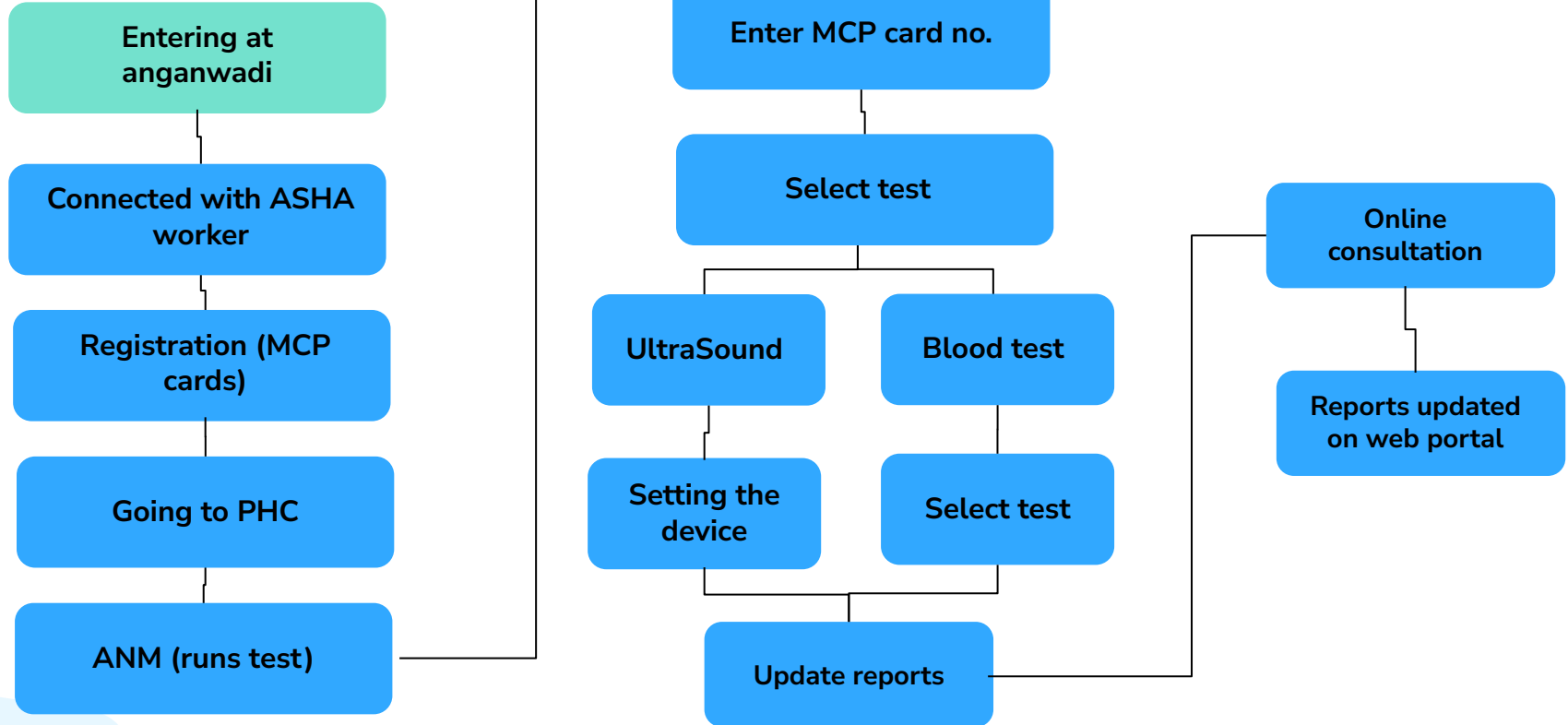
```
Entering at anganwadi
        │
Connected with ASHA worker
        │
Registration (MCP cards)
        │
Going to PHC
        │
ANM (runs test) ──────────── Basic tests
                                  │
                             Enter MCP card no.
                                  │
                             Select test
                              ┌───┴───┐
                        UltraSound   Blood test
                             │            │
                        Setting the   Select test
                         device          │
                             └─────┬──────┘
                             Update reports ──────── Online consultation
                                                           │
                                                     Reports updated on web portal
```

PRODUCT: Care natal

Easy to operate with touch screen as well as physical buttons.

- A portable machine for doing test.
- Easy to carry.

Indicator for showing connectivity

Name: *Radha* Age: *29 yrs.* Sex: *Female*

Month of pregnancy: *2nd*

ULTRA SOUND   BLOOD TESTS

+   −

HOME   CANCEL

ON   OFF

View History →

Next →

Separate slot for blood samples.
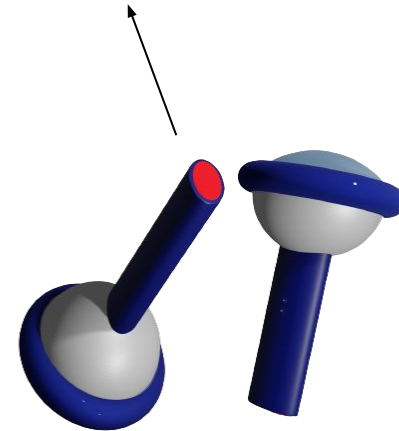
on/off button is there for easy use.

Transducer

Digital Interface for the Product
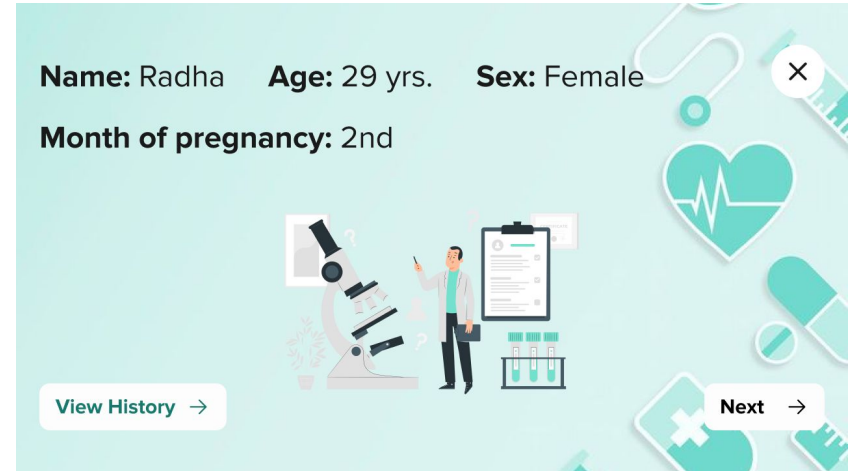
Enter **MCP** Card No.

or

Enter **Aadhar Card** No.

Name: Radha   **Age:** 29 yrs.   **Sex:** Female

Month of pregnancy: 2nd

View History →

Next →

Screen for selecting the option for **MCP** or **Aadhar** card.

After entering the card no. patient information will be displayed to verify.

Digital Interface for the Product
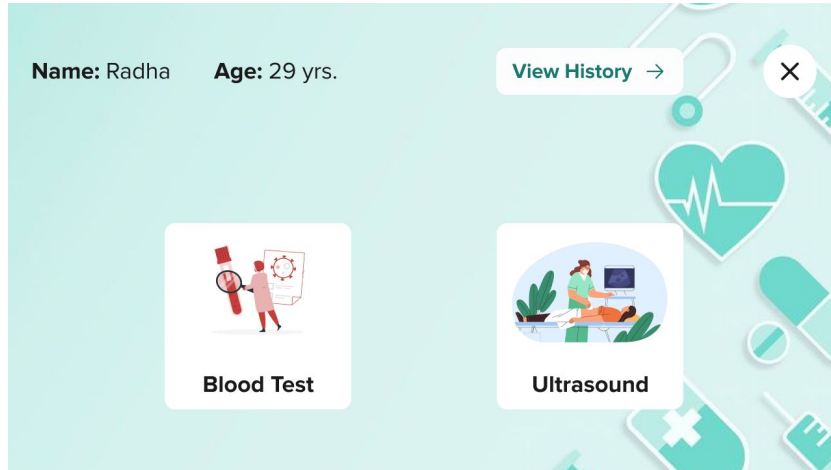
Screen for selecting the option for **Blood** or **Ultrasound** test.
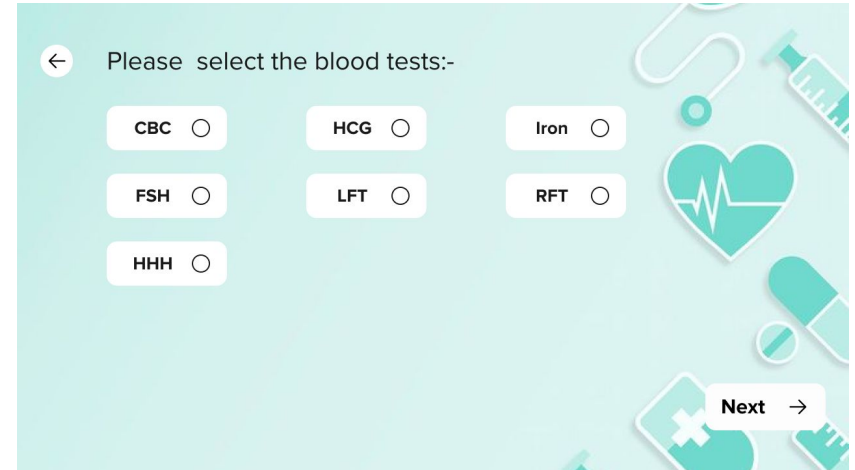
Different options of **Blood test** are there to choose for test.

Digital Interface for the Product

Your **CBC** report is:-

Your Current Reports (01-08-2023)   **Standard Range**

Red Blood Cell (RBC):- 5.20 M/ul   4.40 - 6.00
White Blood Cell (WBC):- 5.40 K/ul   4.0 - 11.0
Platelets Count:- 140 K/ul   150 - 400

Your Past Reports (01-07-2023)

Red Blood Cell (RBC):- 4.20 M/ul
White Blood Cell (WBC):- 3.40 K/ul
Platelets Count:- 100 K/ul

Print

Update on Portal →

thank you!!!

Your report is updated on the portal

Thank you for helping the **Indian Govt.** by updating the report on the portal

Home

View

After doing the test **Current Report** and past report will be shown on the display.

A message screen which shows that the report is updated on the **MCH portal.**

How the updated report look like on MCH Portal for Doctors

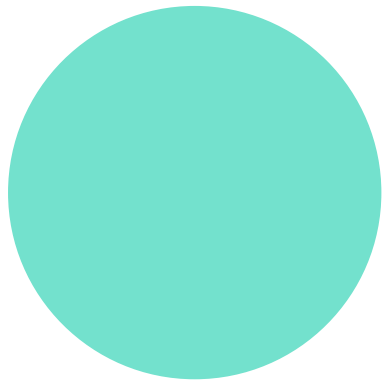On **MCH Portal** the report will look something like this when **Doctor** opens the detail of the patient.

Reproductive & Child Health
Health and Family Welfare Department
Government of India
सत्यमेव जयते

Home

Name: Radha   **Age:** 29 yrs.   **Last Updated on:-** 01-07-2023

Test Done	Results	Standard Range
Red Blood Cell (RBC) Indices		
P.C.V	**32.7**	36 - 46 percent
M.C.V	**69.7**	83- 99 femolitres
M.C.H	**21.9**	27 - 32 pico-grams
M.C.H.C	**31.4**	31.5 - 34.5 percent
RDW - SD	**44.7**	39 - 46 fl
WBC Differential Count		
Neutrophils	**66**	36 - 46 percent
Eosinophils	**04**	83- 99 femolitres
Lymphocytes	**28**	27 - 32 pico-grams
Basophils	**00**	31.5 - 34.5 percent
Monocytes	**02**	39 - 46 fl

Thank You

PROTOTYPE LINK