

FGAI4H-K-055

E-meeting, 27-29 January 2021

Source: Editor

Title: Overview of issues for DEL09.1 (Mobile Applications) and DEL09.2 (Cloud-based AI applications)

Purpose: Information

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Abstract: This PPT contains a progress report on the use of mobile and cloud-based AI health apps.



Connecting People, Saving Lives

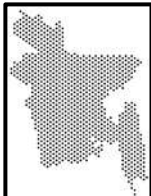


AI4H Mobile applications & Cloud-based AI applications

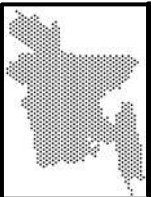
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- **Healthcare**
 - *Prevention, Diagnosis, and Treatment of disease, illness, injury, and other physical and mental impairments in human beings.*
 - *All goods and services designed to promote health, including preventive, curative and palliative interventions.*
- **Healthcare Systems**
 - Provide **Preventive Care, Primary care, Secondary care, and Tertiary care**, as well as in **Public Health**



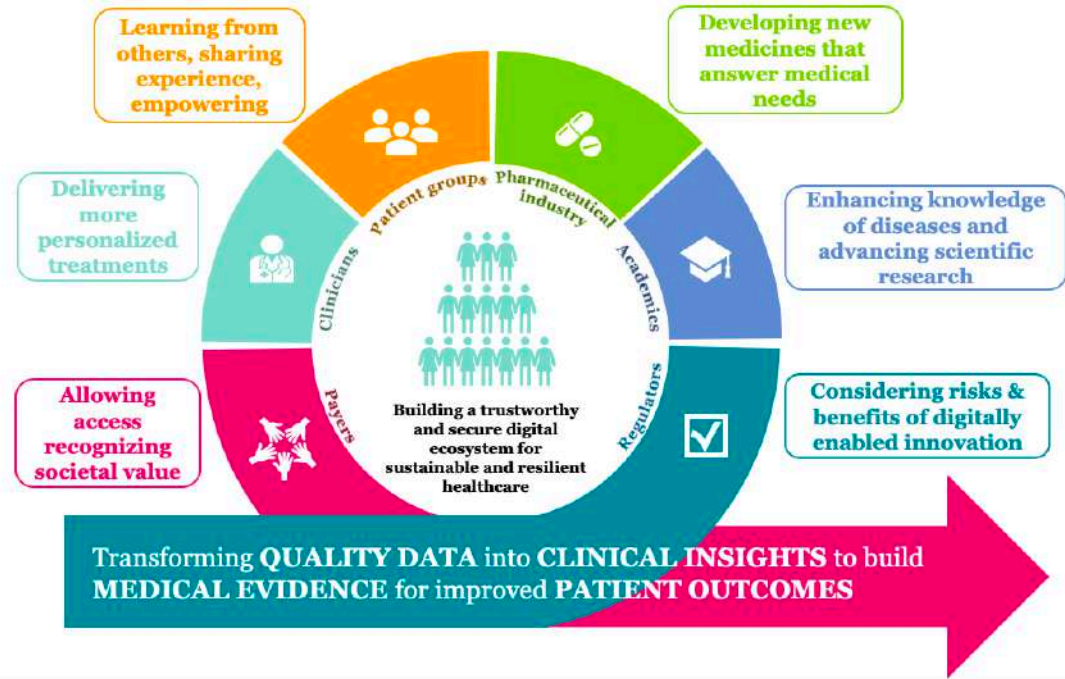
**High Attention (Curative)
Secondary care & Tertiary care**



**Low Attention (Preventive)
Preventive care, Primary care &
Public Health**



Components of Healthcare Systems



Current Healthcare Situation in Bangladesh



bdnews24.com News Classifieds Business Opinion Sport Cricket Tube

Bangladesh can treat 80 percent patients at lower facilities: WHO expert

Senior Correspondent, bdnews24.com
Published: 04 Apr 2019 11:29 PM BdST Updated: 04 Apr 2019 11:29 PM BdST

Without good health we can't retain this smile

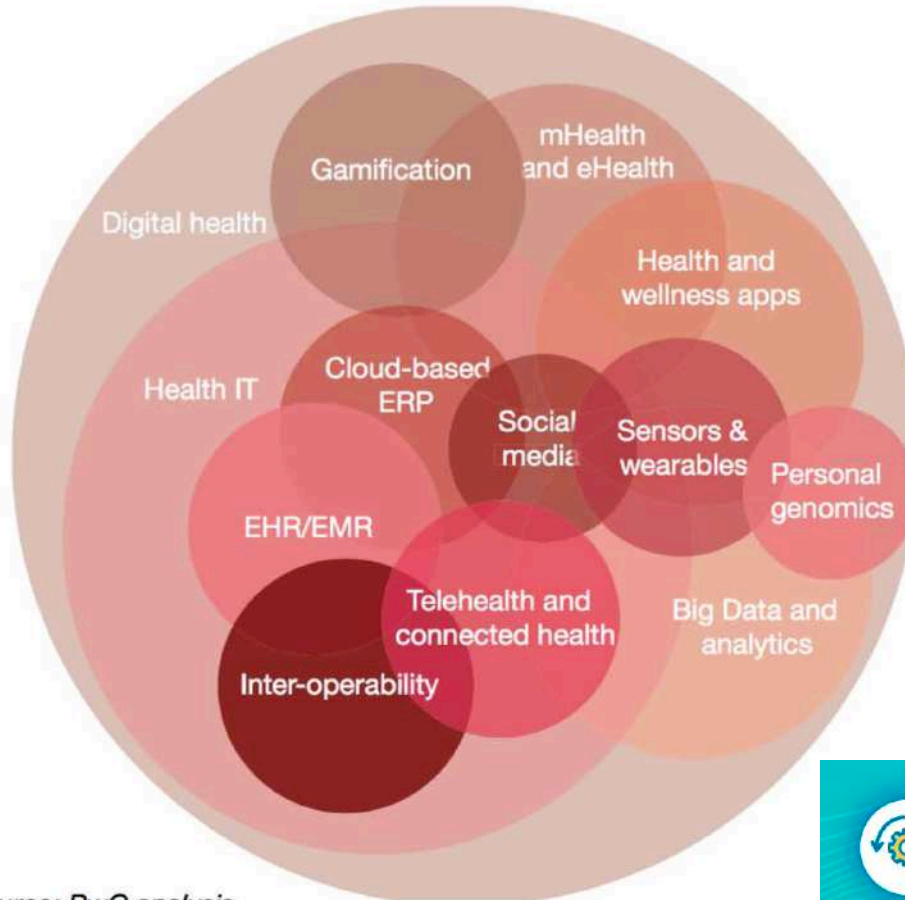
Universal Health Coverage



The United Nations **Sustainable Development Goals** that all UN Member States have agreed to try to **achieve Universal Health Coverage by 2030**. This includes financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

Digital health ecosystem

Digital health components



What does it mean for healthcare:

- Improve access
- Quality care
- Better information
- Better patient outcomes
- Increase patient engagement
- Enhance information flow

Source: PwC analysis



Efficient



Accessible



Inclusive



Affordable

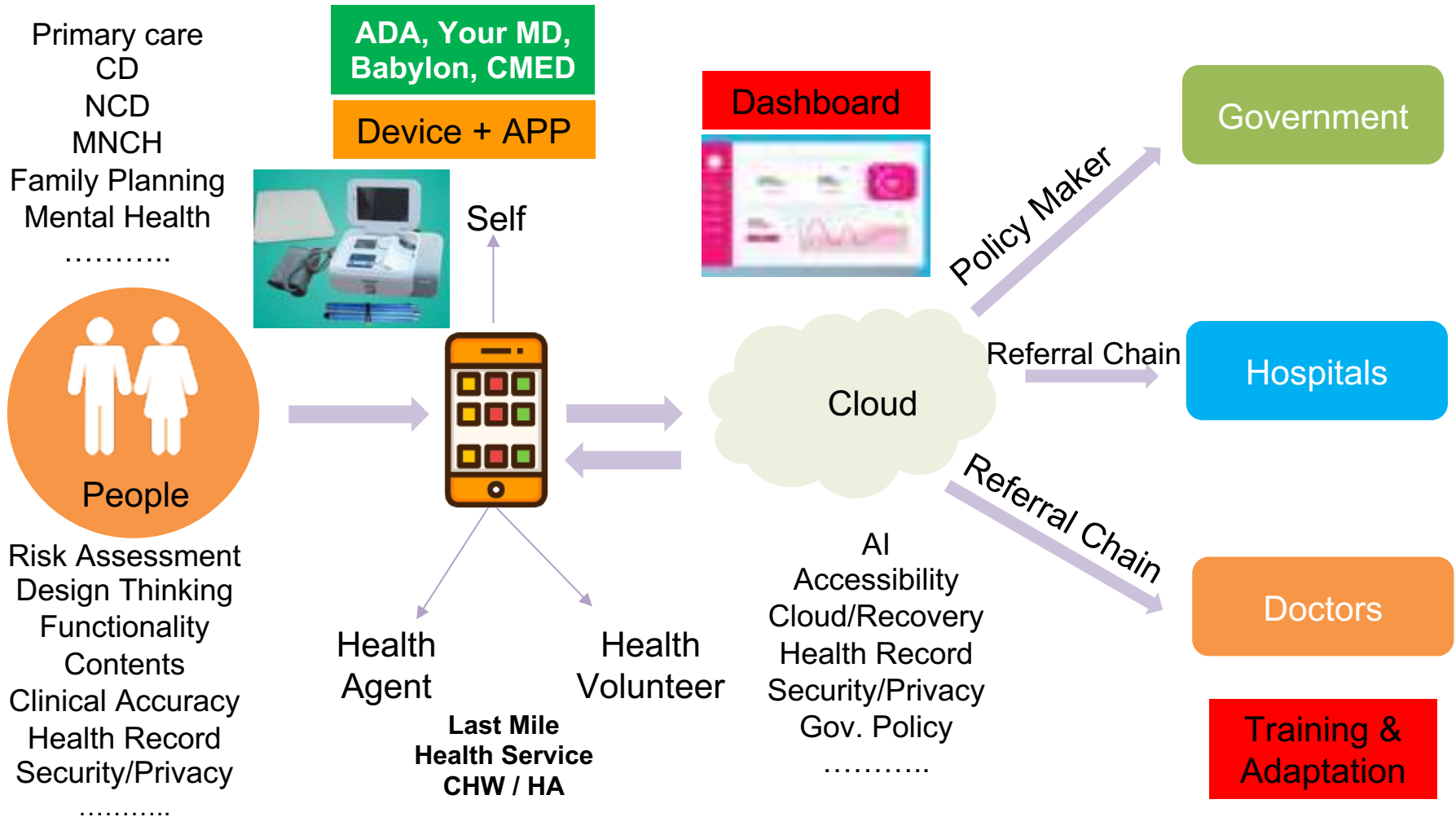


Timely



Safe

AI4H Mobile applications & Cloud-based AI applications



Research on Healthcare Situation in Bangladesh (2015)



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CMED: Cloud based medical system framework for rural health monitoring in developing countries

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Healthcare Situation in Bangladesh

2.5% of world population living in 0.03% Area



67% Death Due to NCD

No Referral System
Health Record

74% Out of Pocket Expense
No Health Insurance

\$10B+
Spent on Health care/year





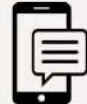
Infrastructure Situation in Bangladesh



Infrastructure of Digital Bangladesh

DIGITAL IN BANGLADESH

A Snapshot of the country's key digital statistical indicators

TOTAL POPULATION	INTERNET USERS	ACTIVE SOCIAL MEDIA USERS	MOBILE CONNECTIONS	ACTIVE MOBILE SOCIAL USERS
				
167.2 Million	91.2 Million	34 Million	157.2 Million	32.0 Million
Urbanisation: 37%	Penetration: 55%	Penetration: 20%	vs. Population: 94%	Penetration: 19%

SOURCES: POPULATION: UNITED NATIONS; U.S. CENSUS BUREAU; MOBILE: GSMA INTELLIGENCE; INTERNET: INTERNET WORLDSTATS; ITU; WORLD BANK; CIA WORLD FACTBOOK; EURICSTAT; LOCAL GOVERNMENT BODIES AND REGULATORY AUTHORITIES; INDIACTIMEDIA.ORG; REPORTS IN REPUTABLE MEDIA; SOCIAL MEDIA PLATFORMS' SELF-SERVICE ADVERTISING TOOLS; PRESS RELEASES AND INVESTOR EARNINGS ANNOUNCEMENTS; AARF SOCIAL MEDIA REPORT; TECHRASA; NIJO AGHARE; DOSE ALL (ALL LATEST AVAILABLE DATA IN JANUARY 2020).



CMED

Connecting People, Saving Lives

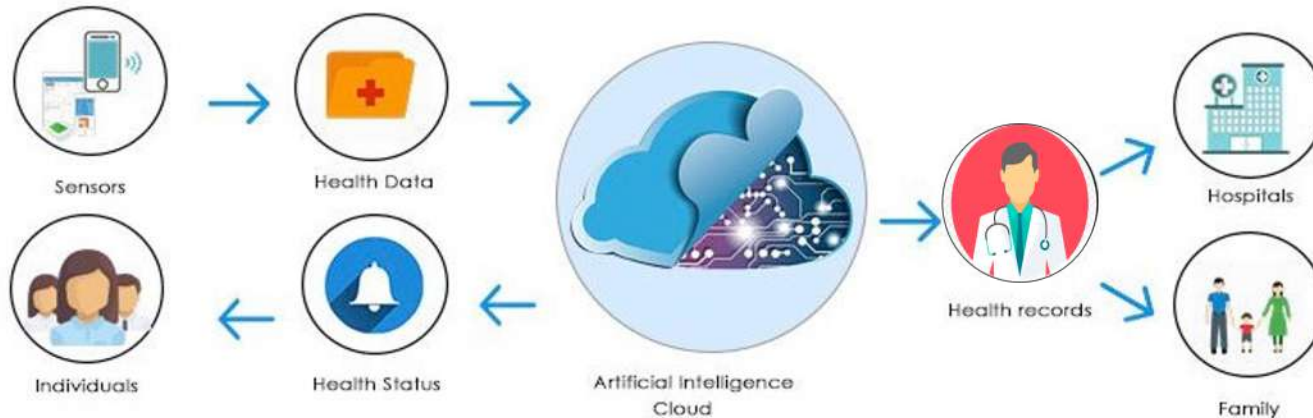


Last Mile Health Service for
Universal Health Coverage



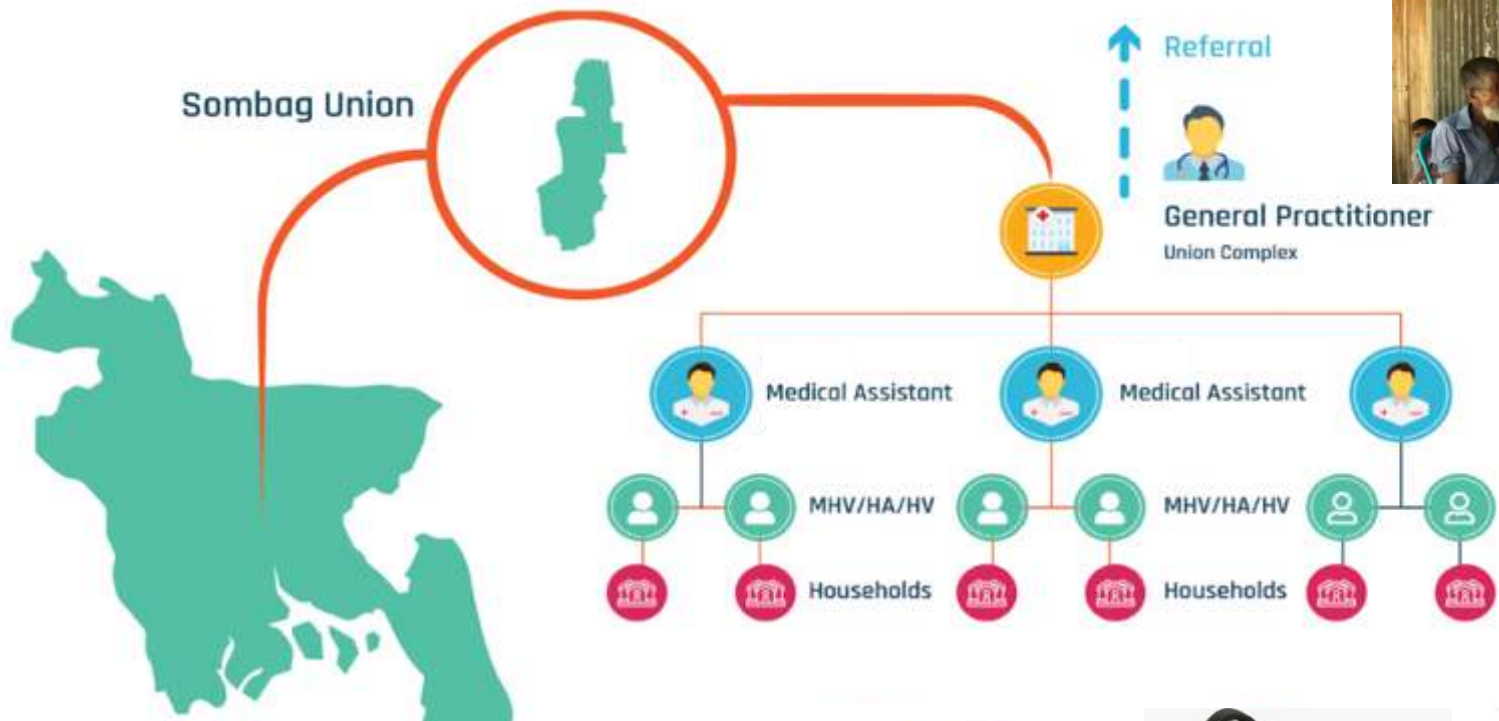
Digital Healthcare Platform

IoT enabled Artificial Intelligence Driven Cloud based System



- Health Monitoring
- Education and Awareness
- Risk Assessment & Referral
- Health Record & Ubiquitous Access to data
- AI Driven Risk Prediction for Stroke, Heart Attack and Diabetes

CMED Digital Healthcare Platform for Primary and Preventive Care



Doctor Consultation



Doorstep Healthcare Service & Referral

Bangladesh



Health Visitor



Household



Smart Health Kit



Health Screening

How CMED Digital Primary Healthcare Service Model Works



Benefits

The screenshot displays a mobile application interface for patient management. At the top, there is a green header with a back arrow, the text '001 (০১, কুলিন্দা)', and a 'গেট' button. Below the header, there are two tabs: 'খানা সন্ধ্যা' and 'খানা সন্ধ্যা'. The main content area shows a list of five patients, each with a name, a phone number, and a set of icons. Blue arrows point from text labels to these icons:

- Khana Prodhan** points to the red person icon of **হাবিবুর রহমান** (01680113488).
- Contact Info** points to the green person icon of **রহিমা বেগম** (01976484654).
- Name** points to the green person icon of **করিম রহমান**.
- Dead** points to the grey person icon of **আব্দুল মালেক** (01887548464).
- Diabetic** points to the red heart icon of **হাবিবুর রহমান**.
- Hypertension** points to the red heart icon of **হাবিবুর রহমান**.
- Freedom Fighter** points to the Indian flag icon of **হাবিবুর রহমান**.
- Pregnant (Tracking ANC, PNC and other Services)** points to the pregnant woman icon of **রহিমা বেগম**.

More icons can be added to identify new groups

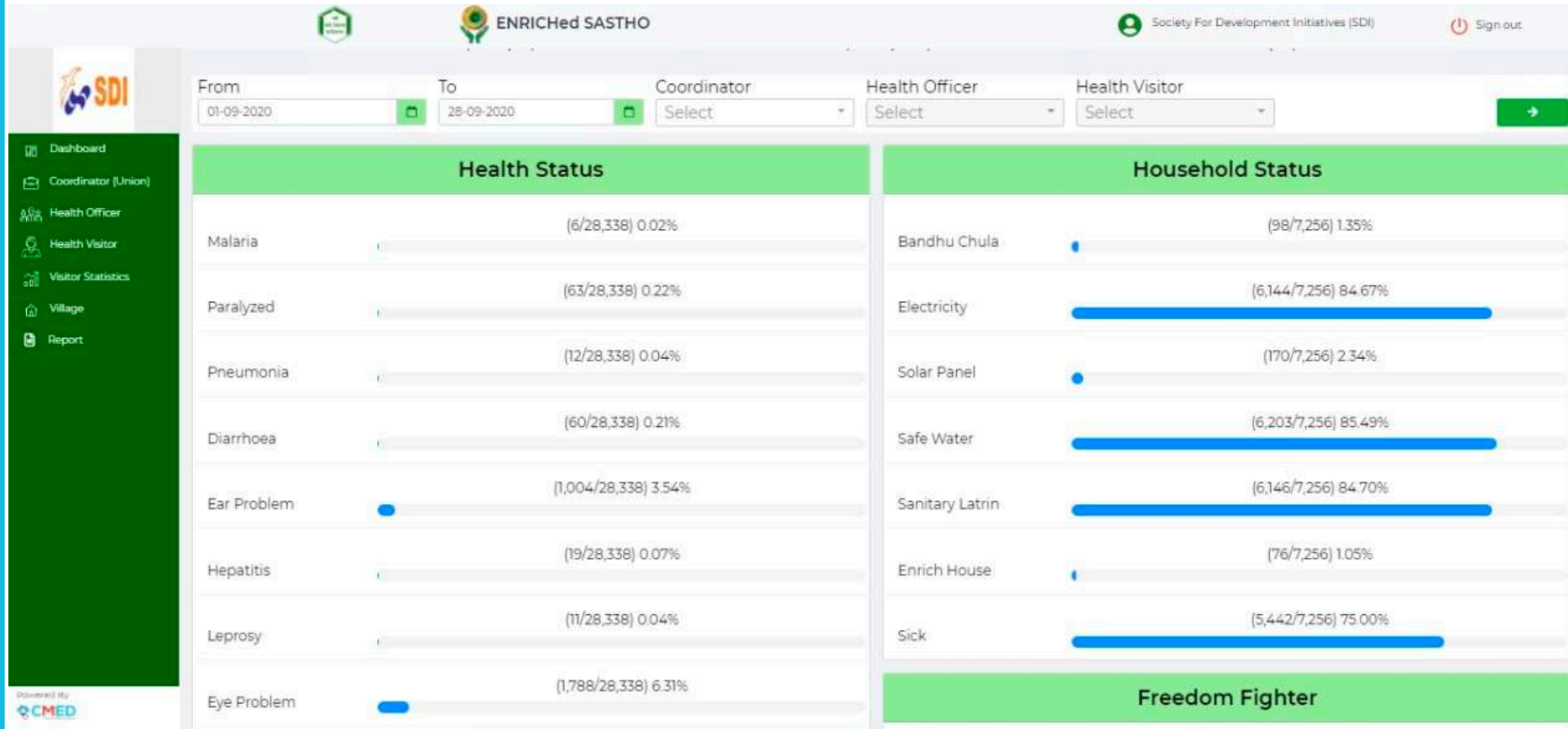
CMED Digital Healthcare Platform for Primary and Preventive Care

CMED Platform for PKSF (Monitoring & Management Dashboard)



CMED Digital Healthcare Platform for Primary and Preventive Care

CMED Platform for PKSF (Monitoring & Management Dashboard)



CMED Digital Healthcare Platform for Primary and Preventive Care

CMED Platform for PKSF (Monitoring & Management Dashboard)



CMED Digital Healthcare Service Delivery



Scaling of CMED Digital Health Service



SDG



Impact

1.6 Million+
Registered Users by 2020

1,000+
Jobs Created

1100+
Villages Covered
(51 Unions)

Award & Recognition



Winner
Healthcare



Merit Winner
2019

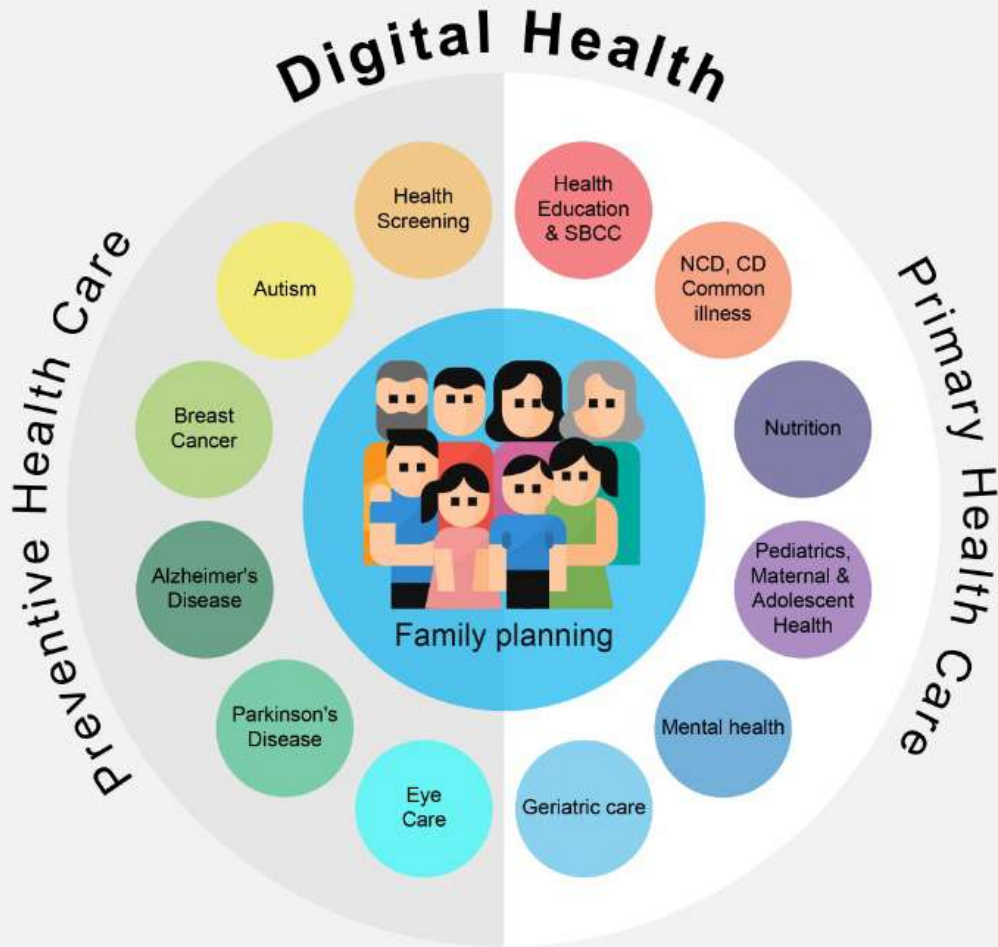


Winner: THF
Innovation
Award 2018

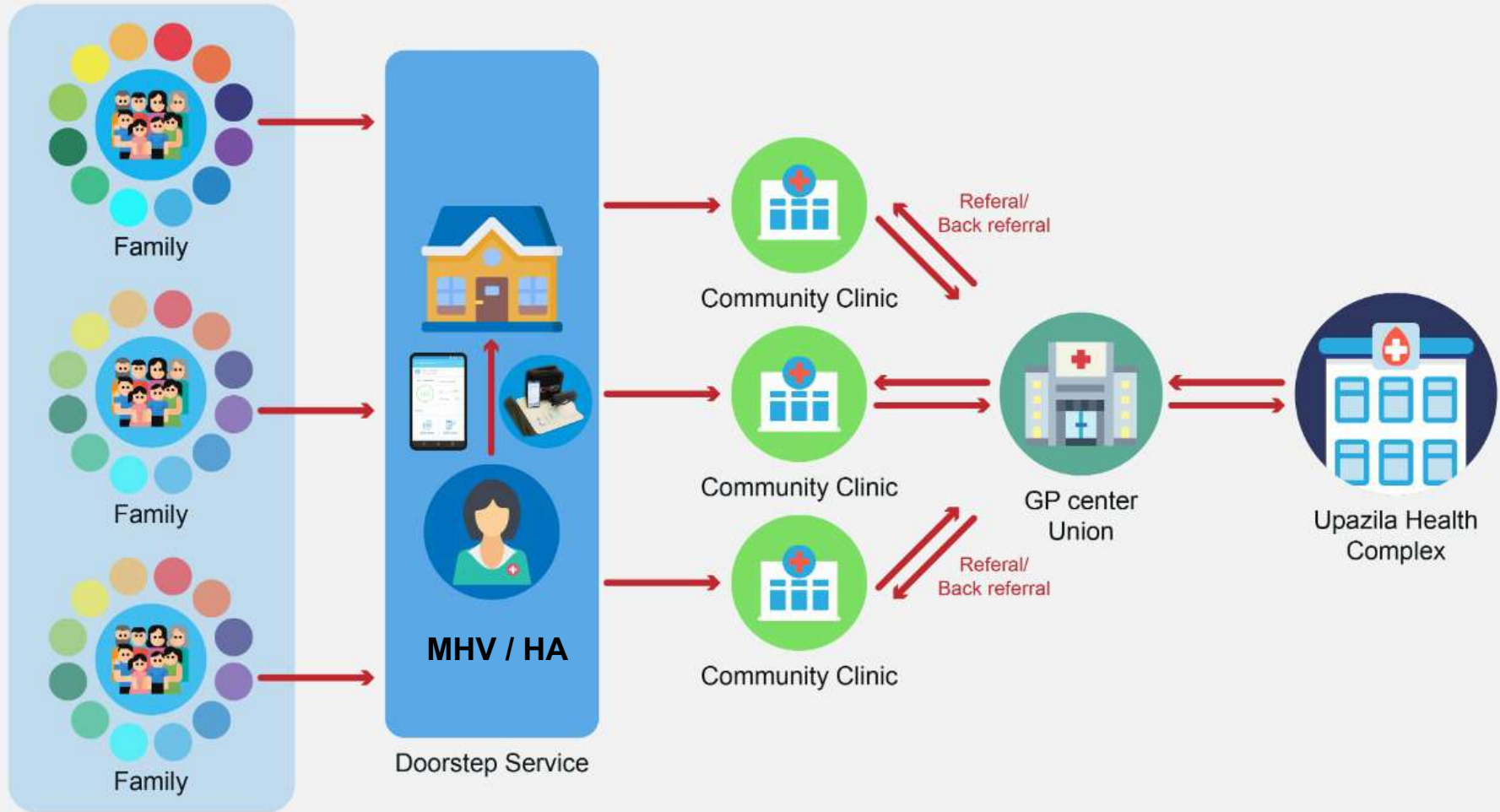


Global
Innovation
Winner 2018

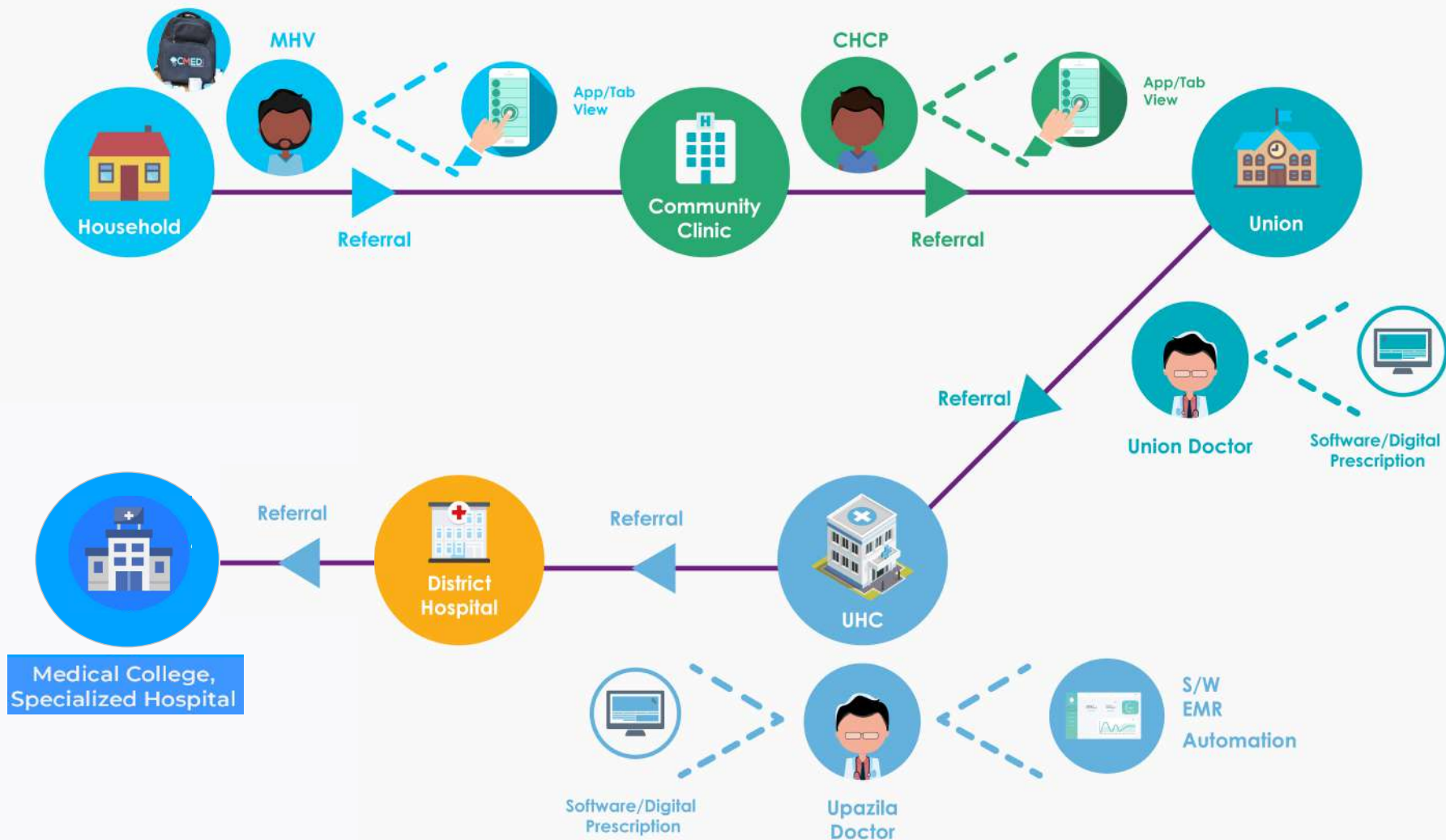
General Practitioner (GP) Model for Rural Health System



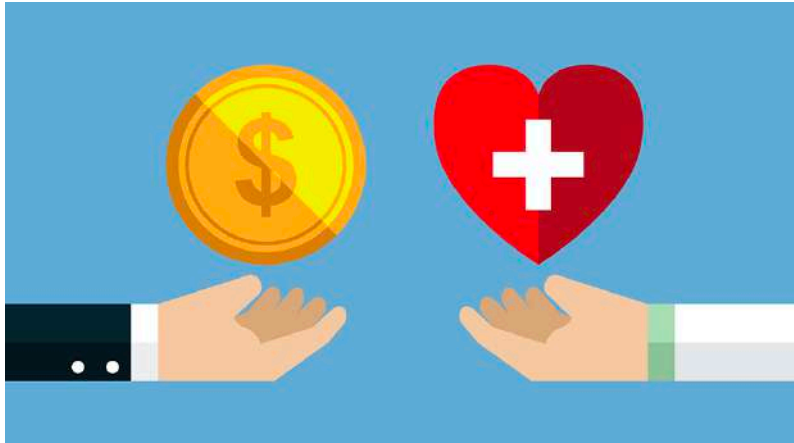
General Practitioner (GP) Model for Rural Health System



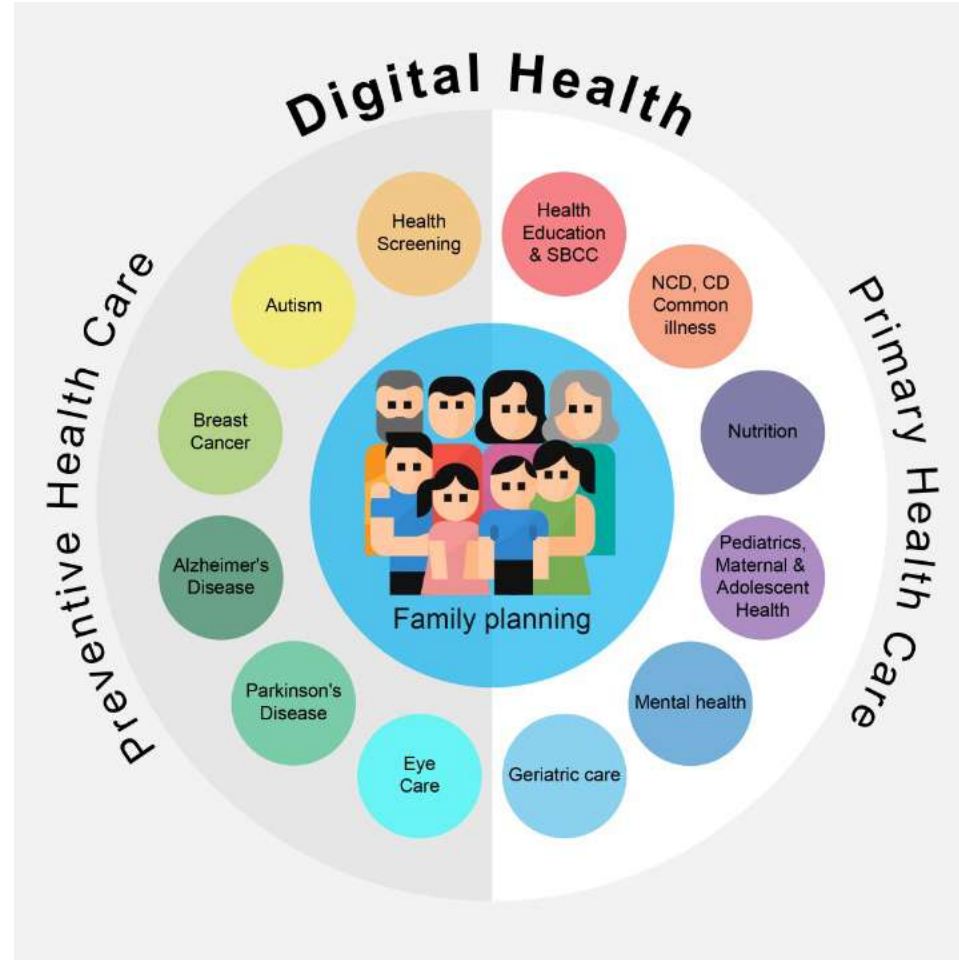
GP Model and Referrals System from Household to District Hospital



General Practitioner (GP) Model for Rural Health System



Cost of PHC



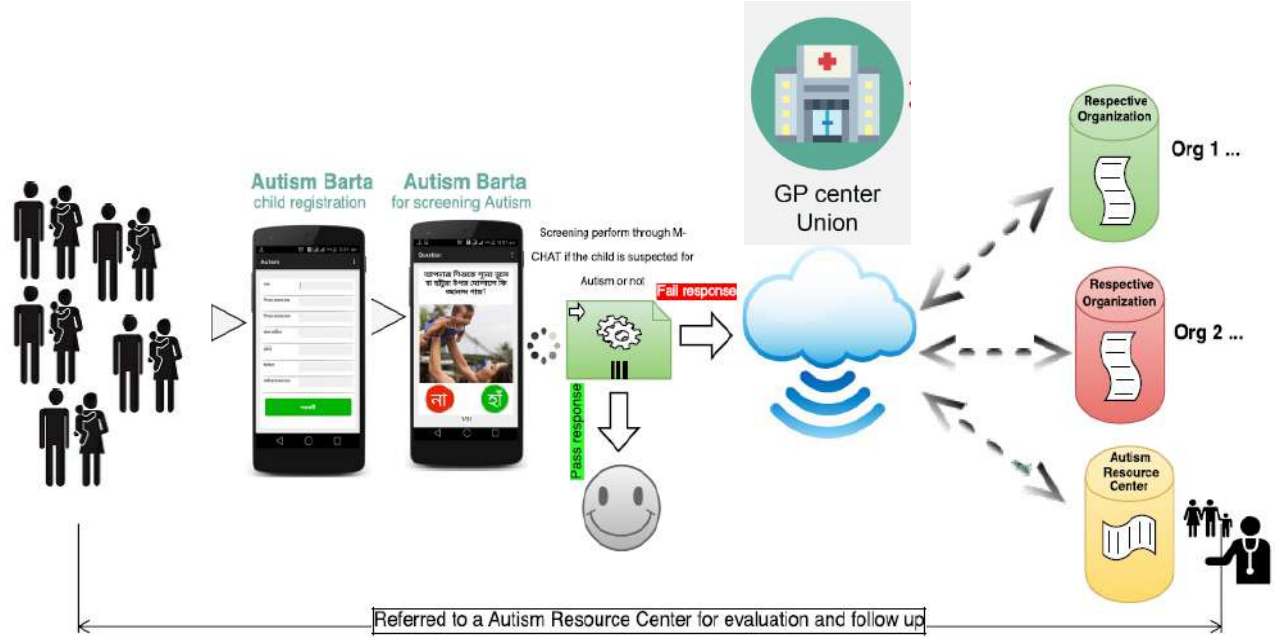
BDT 100/Family/Month



জাতীয় প্রতিবন্ধী উন্নয়ন ফাউন্ডেশন
সমাজকল্যাণ মন্ত্রণালয়



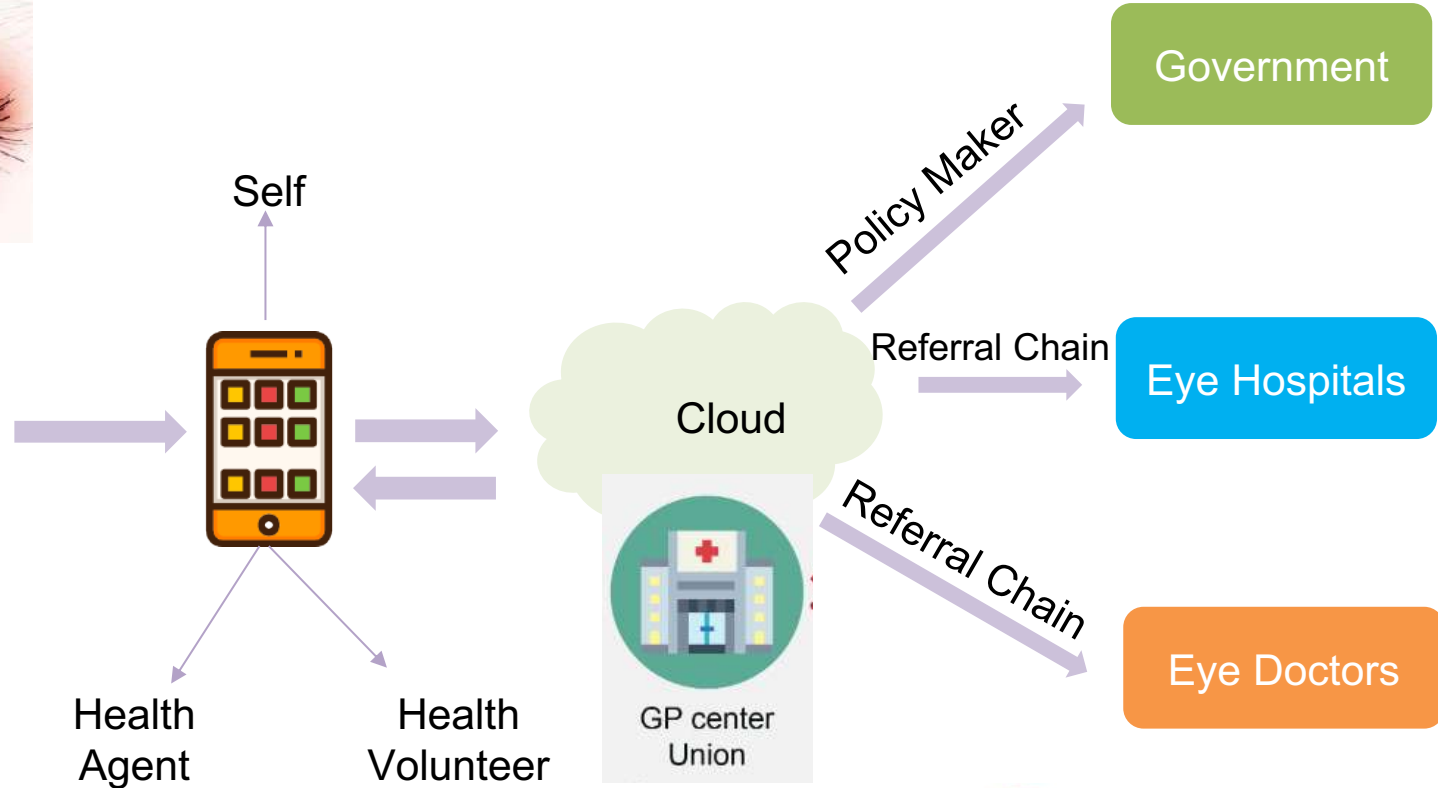
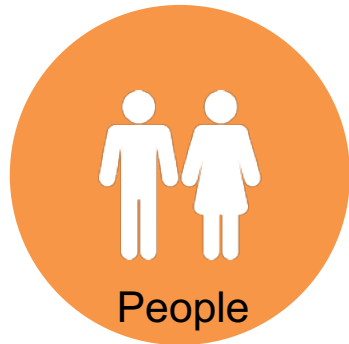
Autism Barta: Automated Autism Screening Tools



INSTITUTE FOR PAEDIATRIC NEURODISORDER & AUTISM (IPNA)
BANGABANDHU SHEIKH MUJIB MEDICAL UNIVERSITY (BSMMU)



Virtual Eye Doc: Smart Mobile App for Eye Exam



PVDoc: Parkinson's Virtual Doctor

**Cloud based AI Driven
Screening and Monitoring
System for Parkinson's
Diseases**

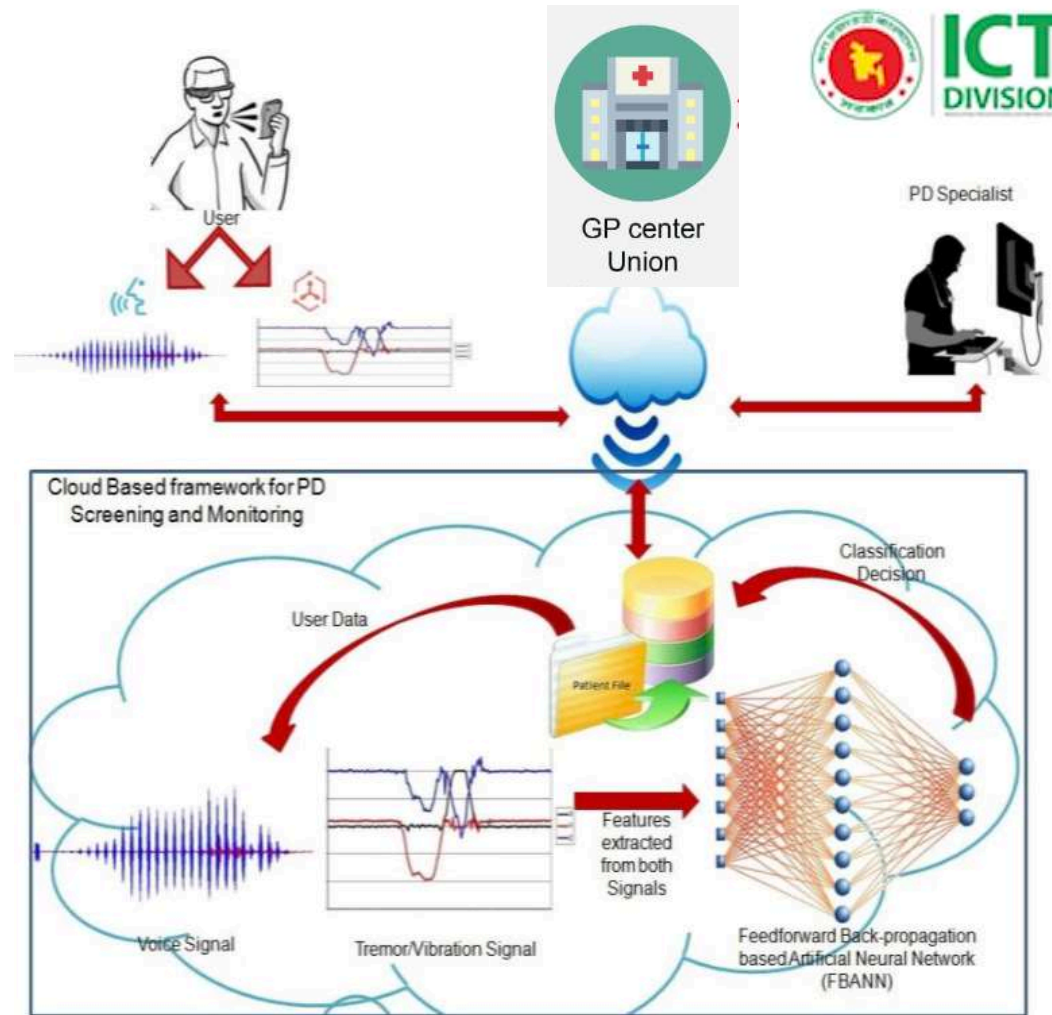
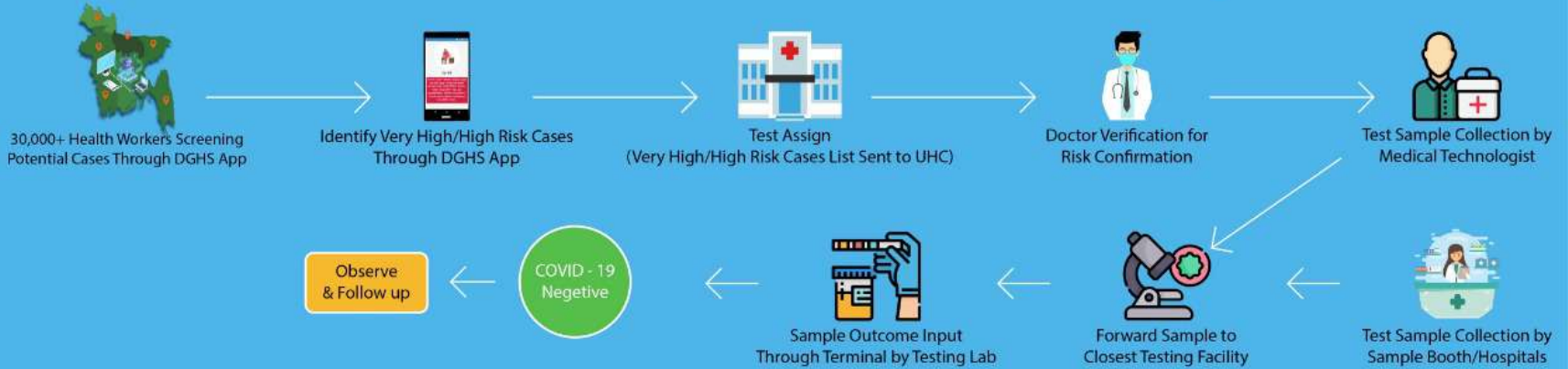


Figure 1. PVDoctor framework with its primary users.

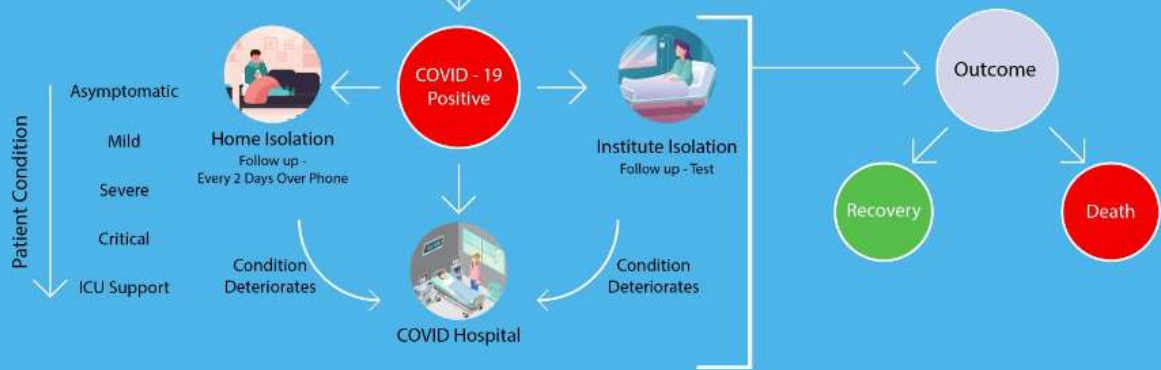


AI Based COVID-19 Digital Surveillance Platform

COVID - 19 Case Identification & Patient Outcome Management



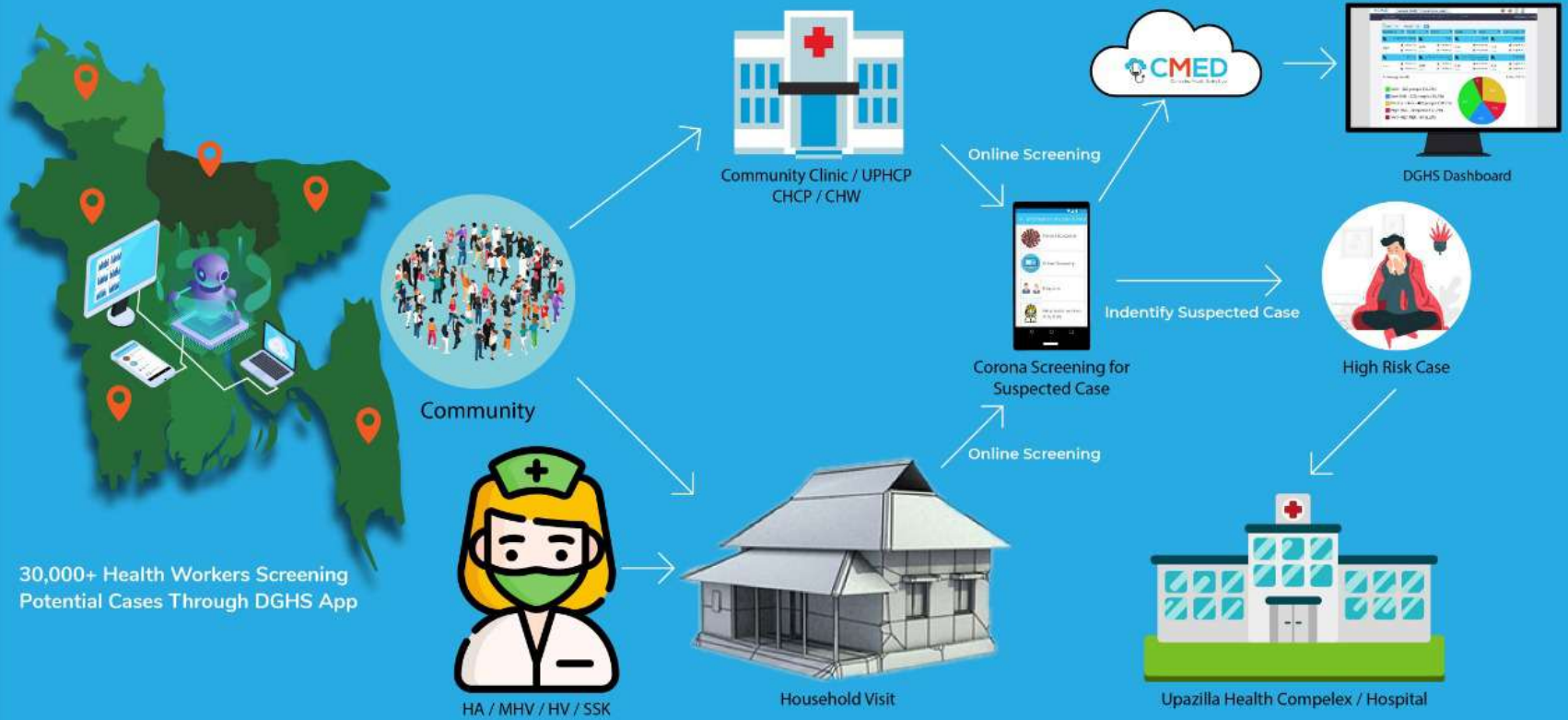
- Screening
- Sample Collection
- Testing
- Isolation / Hospitalisation
- Outcome
- Dashboard
- Monitoring
- Data Analytics
- Follow up History
- Patient History
- Resource Allocation





AI Based COVID-19 Digital Surveillance Platform

COVID-19 National Community Surveillance System





AI Based COVID-19 Digital Surveillance Platform



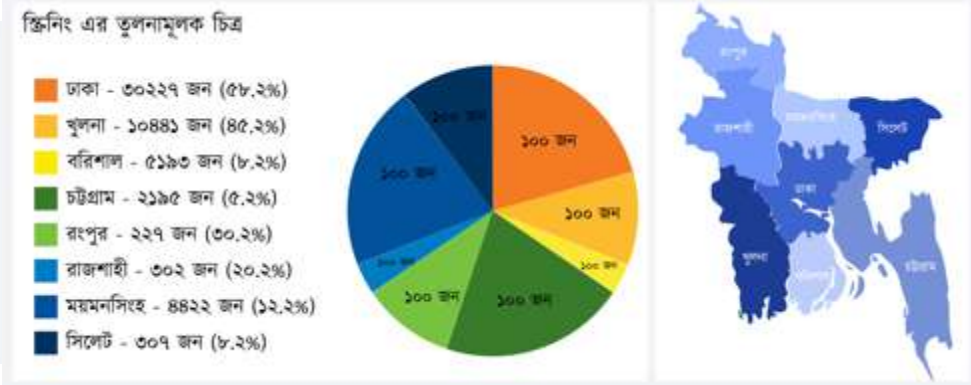
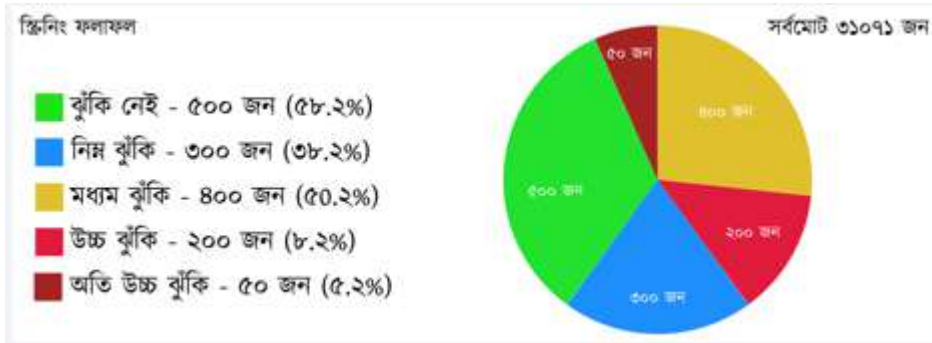
National
COVID-19
Surveillance
System
Dashboard
(Screening
Analytics)

Nationwide
20,00,000+
People
Served

Screening
Analytics

<https://cme.d.com.bd/covid-19-screening-analytics/>

AI Based COVID-19 Digital Surveillance Dashboard



Initiative & Implementation

Research

Development & Maintenance





COVID-19 Test Appointment, Payment Verification, Sample Collection and Results System

Log Out

Sample Collection & Result Result Report Today, June 7, 2020

Date: 10/06/2020 10/06/2020

Laboratory Name Sample Collection Point Result Test Status

View Only: 25 50

Division District Upazila View Download

Serial	Sample Collection Point	Laboratory Name	Patient Name	Mobile No.	Division	District	Upazila	Collection Date	Test Date	Result
01	Dhaka Medical	Kurmitola Hospital	Abdul KORim	01611-123 456	Dhaka	Dhaka	Dhaka	10/06/2020	10/06/2020	Positive
02	Dhaka Medical	Kurmitola Hospital	Kobir Ullah	01611-123 456	Dhaka	Dhaka	Dhaka	10/06/2020	10/06/2020	Positive
03	Dhaka Medical	Kurmitola Hospital	Amir Hossain	01611-123 456	Dhaka	Dhaka	Dhaka	10/06/2020	10/06/2020	Negative
04	Dhaka Medical	Kurmitola Hospital	Korim	01611-123 456	Dhaka	Dhaka	Dhaka	10/06/2020	10/06/2020	Positive
05	Dhaka Medical	Kurmitola Hospital	Rohim	01611-123 456	Dhaka	Dhaka	Dhaka	10/06/2020	10/06/2020	Positive

Sample Collection & Result Sample Collection Report Today, June 7, 2020

Date: 10/06/2020 10/06/2020

View Only: 25 50

Division District Upazila View Download

Serial	Collector's name	Designation	Mobile No.	Division	District	Upazila	Number of sample collected
01	Abdul Korim	Medical Technologist	01611-123 456	Dhaka	Dhaka	Dhaka	20
02	Abdul Korim	Medical Technologist	01611-123 456	Dhaka	Dhaka	Dhaka	20
03	Abdul Korim	Lab Technologist	01611-123 456	Dhaka	Dhaka	Dhaka	20
04	Abdul Korim	Medical Technologist	01611-123 456	Dhaka	Dhaka	Dhaka	20
05	Abdul Korim	Lab Technologist	01611-123 456	Dhaka	Dhaka	Dhaka	20



COVID-19 Test Report

IEDCR

Patient Name: Amir Hossain Phone No: 01611-123 456
 Age: 31; Male Address: Mirpur 11, Dhaka, Pallabi

Sample Collection Point: Dhaka Medical Sample Collection Date: 20/03/2020
 Lab Name: Kurmitola General Hospital Date of Test: 22/03/2020

Result: Positive

Sample Collection Point: Dhaka Medical Sample Collection Date: 20/04/2020
 Lab Name: Kurmitola General Hospital Date of Test: 22/04/2020

Result: Positive

Sample Collection Point: Dhaka Medical Sample Collection Date: 20/05/2020
 Lab Name: Kurmitola General Hospital Date of Test: 22/05/2020

Result: Negative

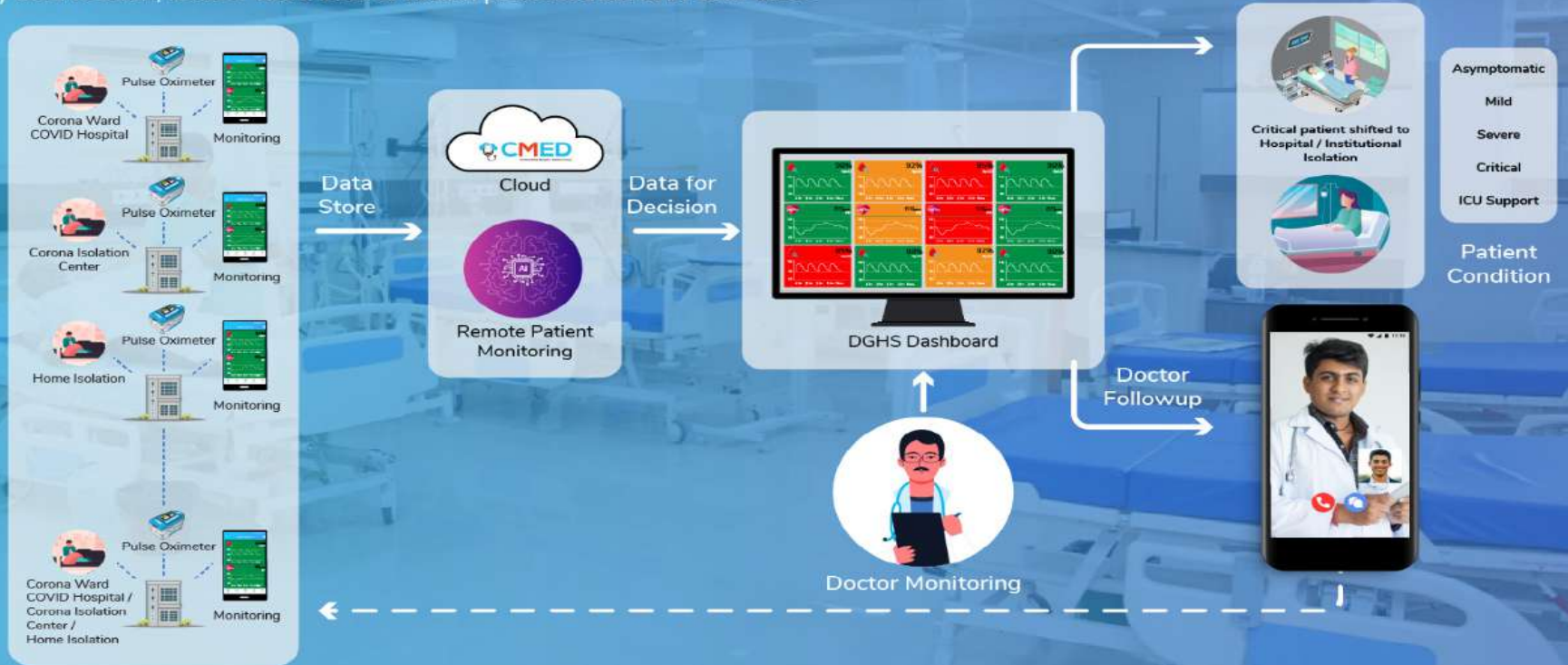
Sample Collection Point: Dhaka Medical Sample Collection Date: 08/06/2020
 Lab Name: Kurmitola General Hospital Date of Test: 10/06/2020

Result: Negative

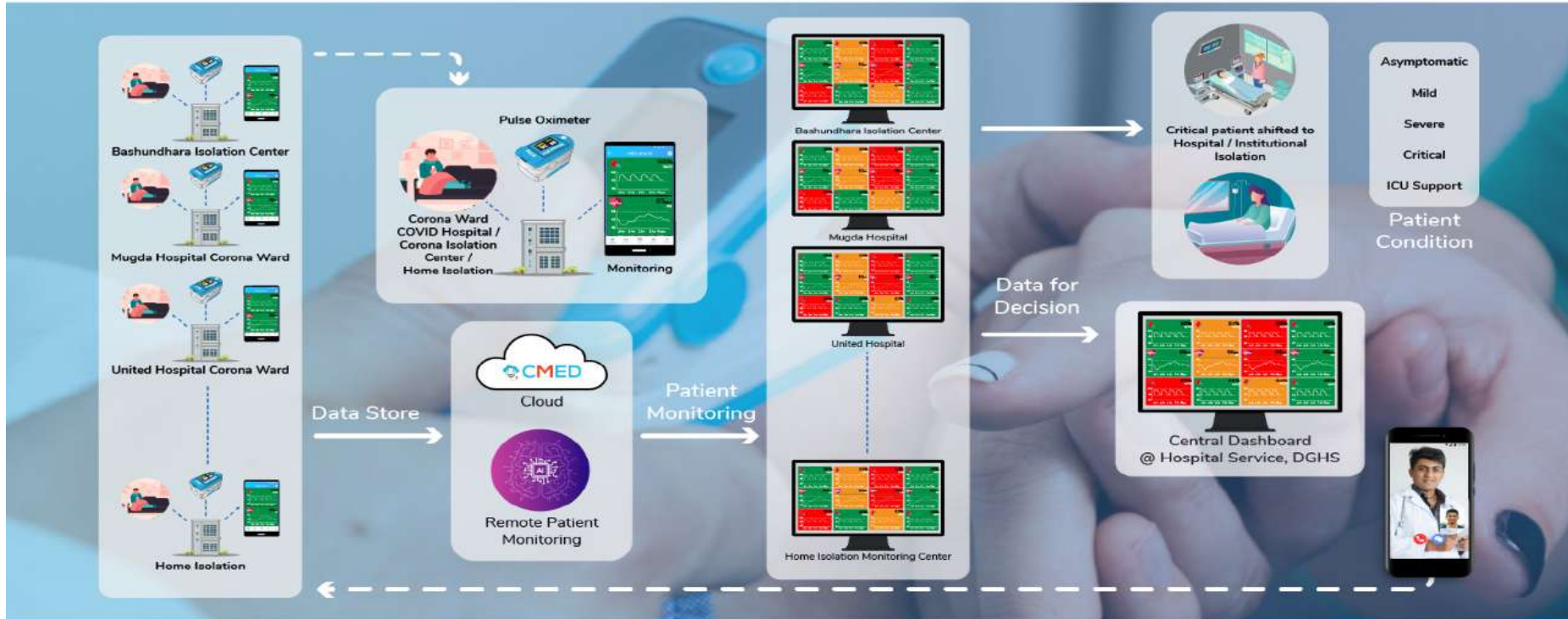
National COVID-19 Surveillance System
 Dashboard (Sample Collection & Lab Results)

COVID-19 Digital Remote Patient Monitoring & Virtual ICU System

Digital remote patient monitoring and virtual ICU system: The system uses technology to monitor patient health outside of a traditional clinical settings, such as in home or in a hospital. It collects level of oxygen in patient's blood along with heart rate, alerts the health care provider if oxygen levels drop below safe levels and assess the need for clinical intervention such as supplemental oxygen. This system can play significant role for monitoring covid-19 patients in different settings like, COVID-19 hospital, isolation center and home isolation to make timely intervention, reduce work load of health professionals and save lives.



COVID-19 Digital Remote Patient Monitoring & Virtual ICU System



Patient Benefits:

- Easy to use
- Fast, accurate, continuous monitoring
- Early detection and earlier intervention
- Minimized complications
- Reduction in hospitalization
- Improved patient management

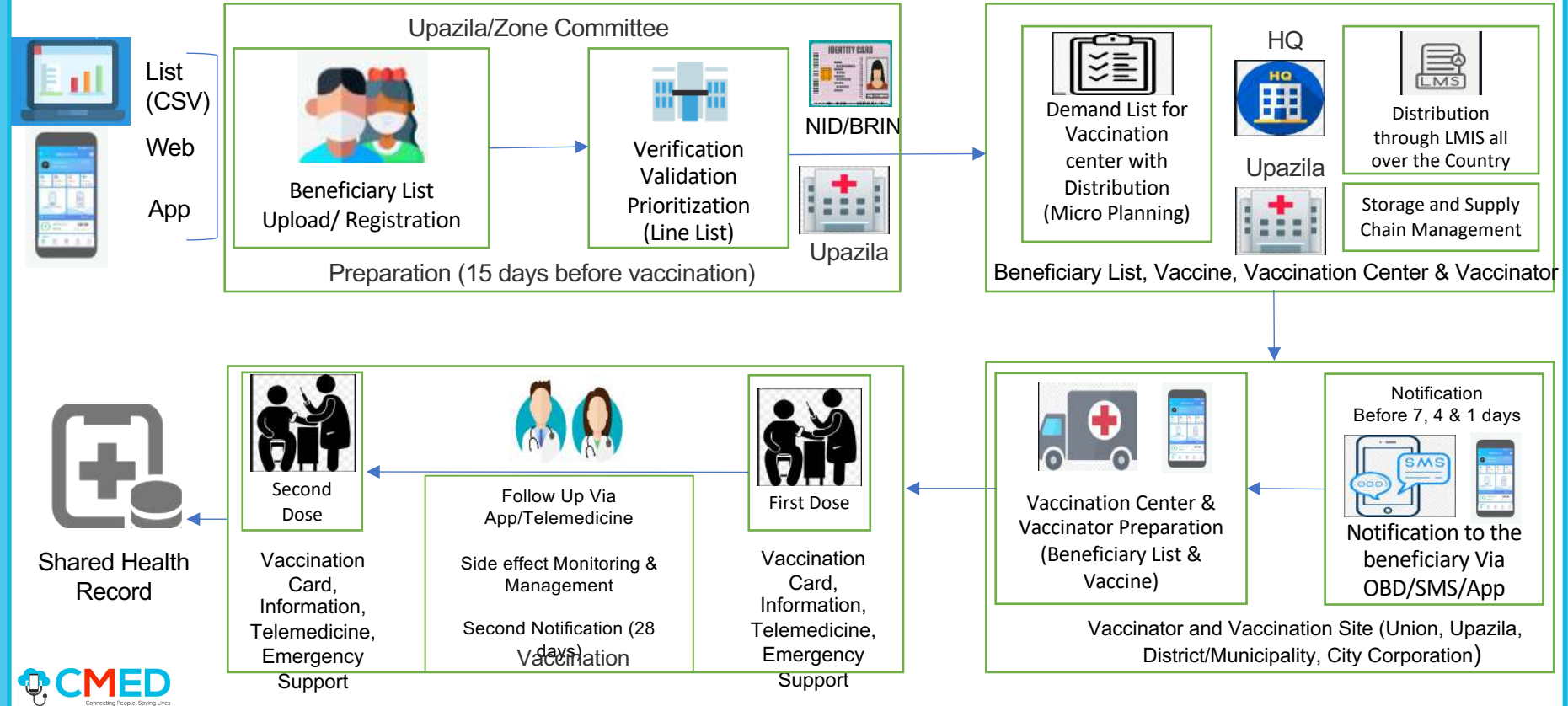
Doctors and Hospital benefits:

- Continuous patient monitoring data streaming could provide real-time patient supervision.
- Balances out the workload and time; no need for rounds to assess patients in such cases.
- Better utilization of medical resources such as the equipment, medical staff, and others.

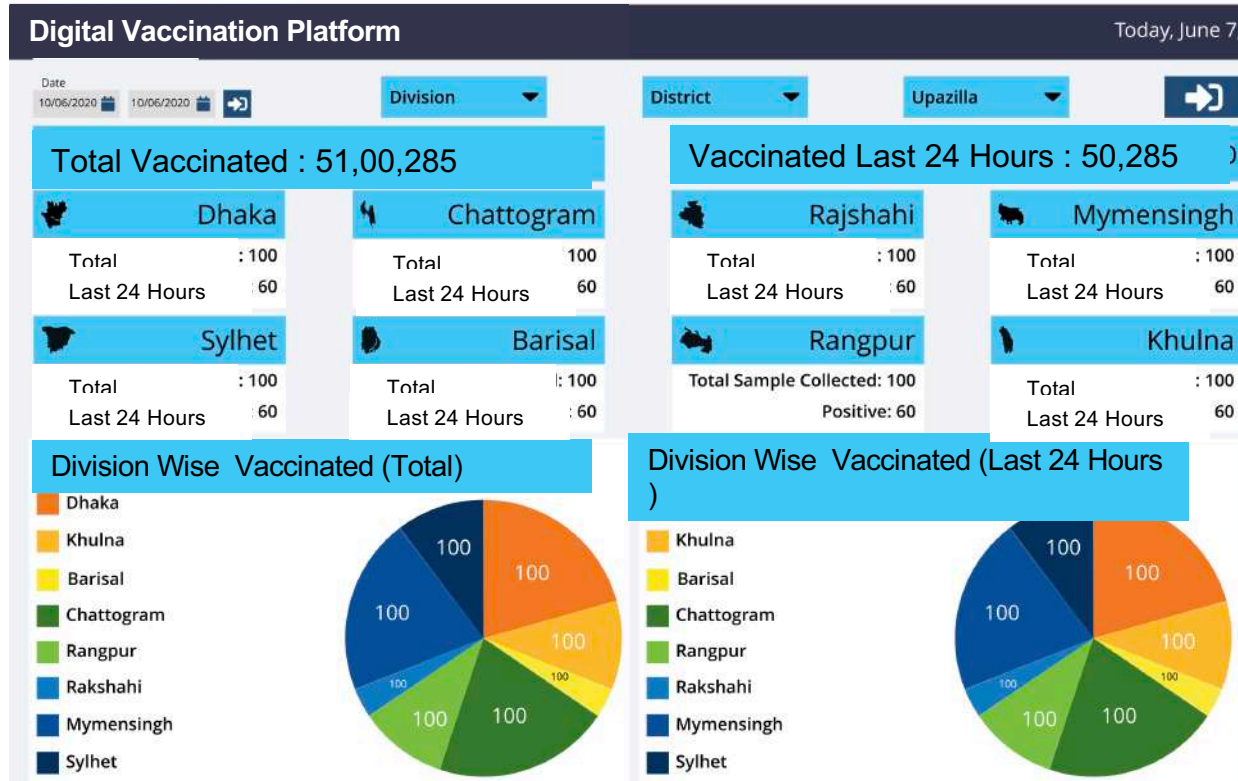
Regulatory Benefits:

- Central monitoring of covid-19 patients
 - Optimize resource mobilization
- Data based decision and intervention
 - Better access to healthcare system

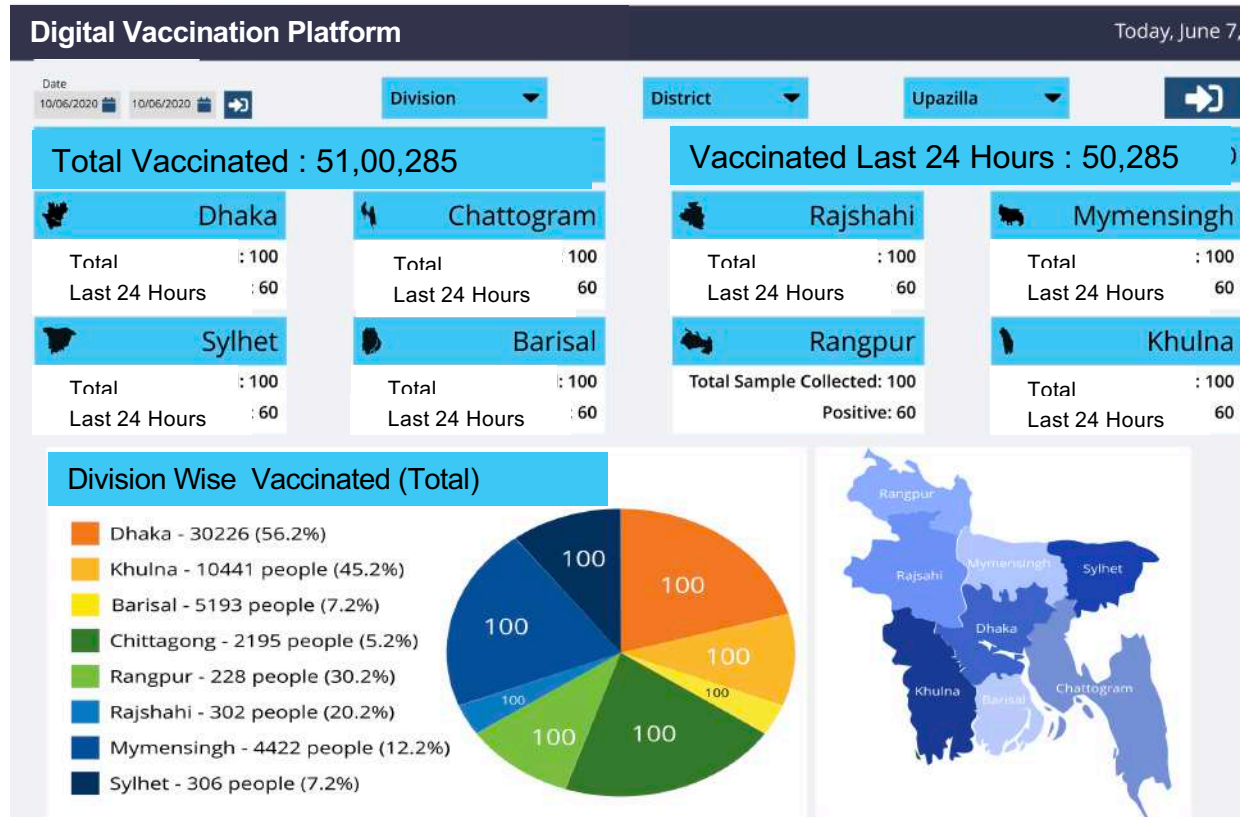
Digital Vaccination Platform (Process Flow)



Digital Vaccination Platform (Dashboard)



Digital Vaccination Platform (Dashboard)



Acknowledgement



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Imperial College London, UK

Dr. Ravi Vaidyanathan, Dr. Michael Mace

University of Oxford, UK

Professor Tipu Aziz, Professor John Stein

Florida International University, USA

Dr. Hai Deng

King Saud University, Saudi Arabia

Dr. Ghulam Muhammad

United International University, Bangladesh

Professor Mohammad Nurul Huda



Technology for Innovation & Impact

