

# Technology enabled HYBRID Health Care

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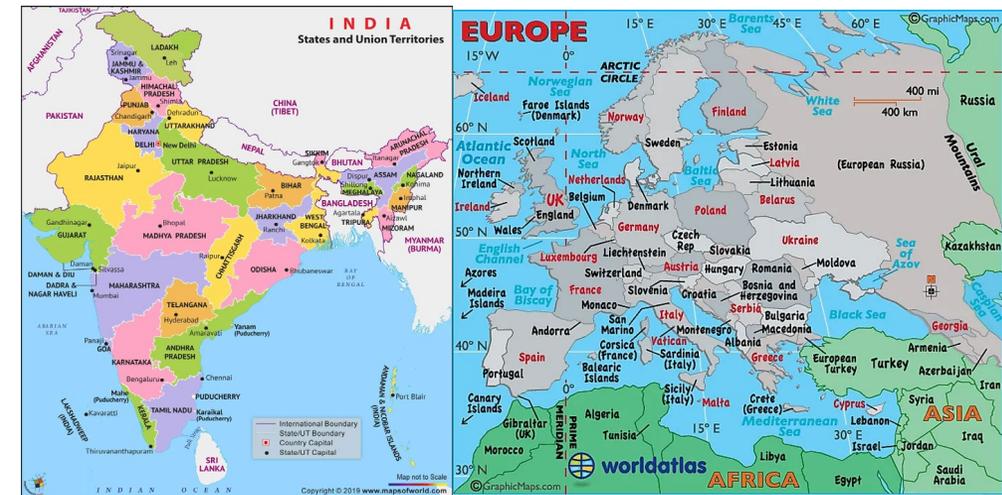
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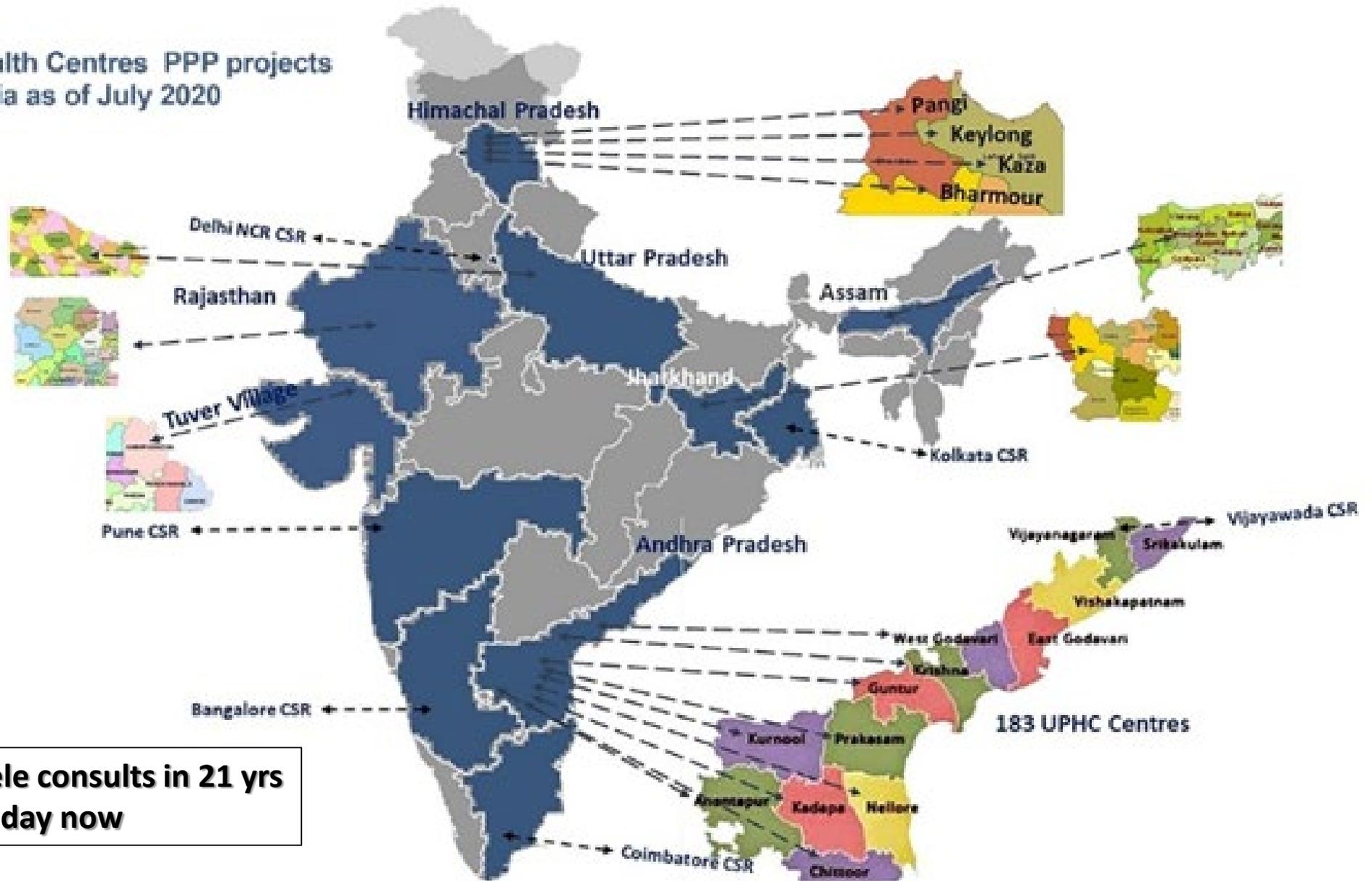
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Apollo Tele Health Services



Collaborating for Digital Health and Care in Europe



**Apollo Telehealth Centres PPP projects in India as of July 2020**



**13 Million tele consults in 21 yrs  
10,000+ per day now**

# Digital Health Care in Public Private Partnership Mode

<https://pubmed.ncbi.nlm.nih.gov/33819433>

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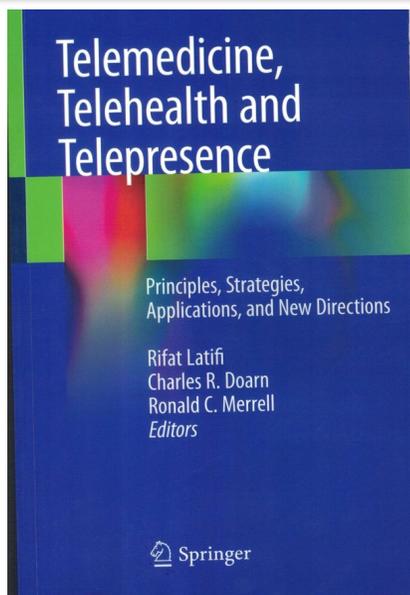
## Abstract

**Background:** Health care is provided in developing countries, in a milieu of acute shortages of health care infrastructure and personnel. Governments are realizing that digital health through public private partnerships (PPPs) could address this

**Keywords:** PPP in telehealth, telehealth, remote health care, telemedicine and PPP, telemedicine

## Introduction

Public private partnership (PPP) projects in health care are a recent phenomenon in India. Figure 1 illustrates the various PPP projects outsourced to Apollo Telehealth Services ([www.apollotelehealth.com](http://www.apollotelehealth.com)). An Urban Primary Health Centre (UPHC) is the first point of health care contact, for those close to the poverty line, living in urban and suburban areas. Through a PPP, Apollo Telehealth Services was designated as the health care provider for 183 UPHCs across nine districts of Andhra Pradesh, a state in South India.<sup>1</sup> In addition to primary health care for a defined target population,



<https://www.springer.com/gp/book/9783030569167>  
Presents all aspects of telemedicine and e-health to the reader

Telehealth Patient Portal: Opportunities and Reality Merrell, Ronald C.	Pages 189-195
<input type="button" value="Preview"/>	<input type="button" value="Buy Chapter 25,95 €"/>
Technology Enabled Remote Healthcare in Public Private Partnership Mode: A Story from India K. Ganapathy, (et al.)	Pages 197-233
<input type="button" value="Preview"/>	<input type="button" value="Buy Chapter 25,95 €"/>
International and Global Telemedicine: Making It Work Alverson, Dale C.	Pages 235-255
<input type="button" value="Preview"/>	<input type="button" value="Buy Chapter 25,95 €"/>

K.Ganapathy © May 2021

## Technology Enabled Remote Healthcare in Public Private Partnership Mode: A Story from India

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K. Ganapathy and Sangita Reddy

### Introduction to Technology-Enabled Remote Healthcare (TeRHC)

A solution is not a solution unless it is universally available to anyone, anytime, anywhere at an affordable cost without compromising quality. This is easier said than done. It is universally known and accepted that providing healthcare in suburban and rural areas, particularly in developing countries, is more than a challenge. Paradoxically the “third world” does not have to follow the advanced countries, not even piggyback or even leap frog. After all, how much can a frog leap! Today emerging economies like India are pole-vaulting. There are no technology-enabled legacy systems to disinherit. Advances in information and communication technology are mind-boggling. The Jugaad approach is making TeRHC a reality. This flexible approach to problem-solving, using limited resources in an innovative way or a simple work-around, signifies creativity – a form of frugal engineering at its peak.

### Telehealth in India: The Beginnings

The challenges in evangelising the very concept of telehealth, creating the necessary awareness and persuading the various stakeholders in a then non-existing ecosystem, to agree to even pilot projects, were so daunting that it was extremely difficult at that time, to collect reliable data, analyse the data and publish the observations. Publications then were limited [1–6]. In what subsequently became a highly downloaded article [7], the principal author demonstrated that as of Sep 2014,

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R. Latifi et al. (eds.), *Telemedicine, Telehealth and Telepresence*,  
[https://doi.org/10.1007/978-3-030-56917-4\\_14](https://doi.org/10.1007/978-3-030-56917-4_14)

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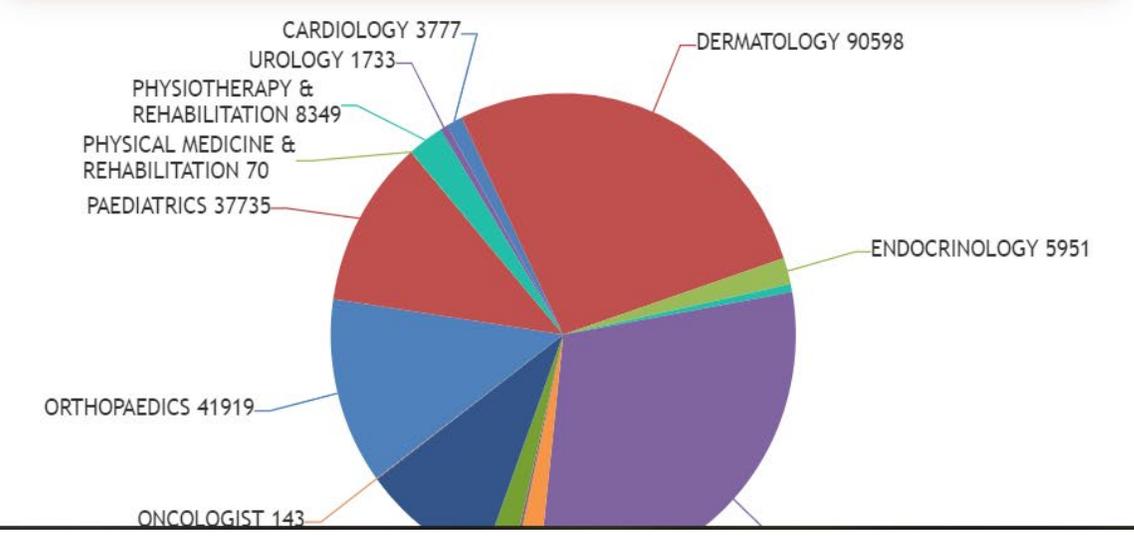
Today's Dashboard (12-05-2021)
 12-05-2021 
12-05-2021 
[GET DETAILS](#)
[TELE CONSULTATIONS](#)
[LOGIN](#)

<b>NUMBER OF BENEFICIARIES PROVIDED TELEMEDICINE SERVICES</b>	<b>CONSULTATIONS COMPLETED</b>	<b>CONSULTATIONS RESCHEDULED</b>	<b>AVERAGE FEEDBACK OF TELEMEDICINE SERVICES</b>	<b>NUMBER OF FUNCTIONAL TELEMEDICINE CENTRES AT CHCS (TODAY)</b>	<b>EMR UPTIME (T-1)</b>	<b>DOCTORS ONBOARD</b>
CUMULATIVE <b>280,118</b> TODAY <b>0</b>	CUMULATIVE <b>334,682</b> TODAY <b>0</b>	CUMULATIVE <b>0</b> TODAY <b>0</b>	<b>4.43</b>	<b>0/120</b>	<b>23:59 ( 100.0 %)</b>	<b>34</b>

**PATIENTS**

Age (Years)	Male	Female
Child (Below 15)	24,651	23,771
Youth (15-34)	46,779	69,962
Adult (35-59)	32,036	48,556
Senior (60 & Above)	19,730	14,633
<b>Total</b>	<b>123,196</b>	<b>156,922</b>

**SPECIALITY WISE COMPLETED CONSULTATIONS**





Real Time Dashboard as on 12<sup>th</sup> of May 2021

Select Language |

- Dashboard
- Unique Registrations
- Patient Visits
- Vitals
- Laboratory Investigation
- Tele Consultations
- Medical Prescription
- Feedback
- Equipment
- Doctors
- Manpower
- Generic Drugs
- Centres Functional Status
- Employee Login Status
- Patient Data Login

Dashboard

Active Centers : 100 / 100

**UNIQUE REGISTRATIONS**

Cumulative	Today	Yesterday
261653	60	73

**PATIENT VISITS**

Cumulative	Today	Yesterday
521807	276	320

**VITALS**

Cumulative	Today	Yesterday
3196466	1774	1997

**LABORATORY INVESTIGATION**

Cumulative	Today	Yesterday
224790	124	198

**TELE CONSULTATIONS**

Cumulative	Today	Yesterday
518032	270	320

**MEDICAL PRESCRIPTION**

Cumulative	Today	Yesterday
501047	266	318

**FUNCTIONAL CENTERS**

Cumulative	Today	Yesterday
100	99	99

**EQUIPMENT**

Cumulative	Today	Yesterday
600	593	593

**ATTENDANCE**

Cumulative	Today	Yesterday
205	174	171

**DOCTORS**

NAME	GENDER	MEDICAL REG.NO.	SPECIALITY
DR. D NEHA SING	Female	94616	OBSTETRICS & GYNECOLOGY

**CENTERS (Today Functional : 99 / Today Non-Functional : 1)**

DISTRICT NAME	CENTER NAME	EQUIPMENT WORKING STATUS	EQUIPMENT NOT WORKING
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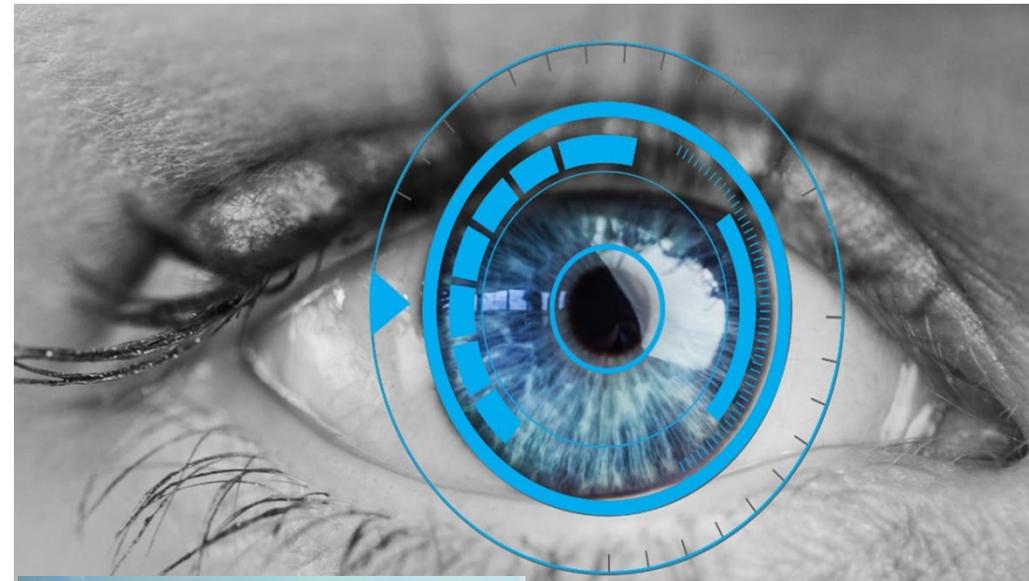
# Mukhyamantri e-Eye Kendram AP Tele Ophthalmology project

APOLLO TELEHEALTH SERVICES announces launch of  
India's largest PPP IN TELEOPHTHALMOLOGY

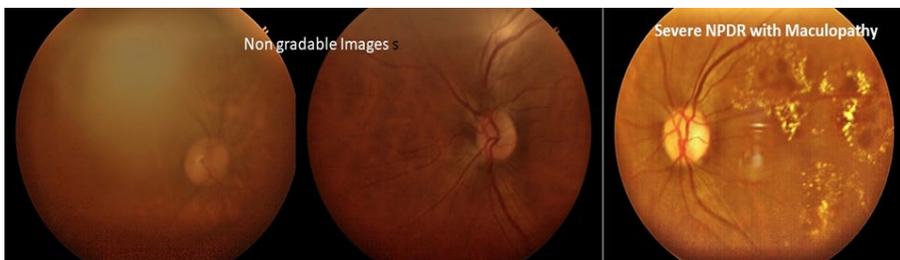
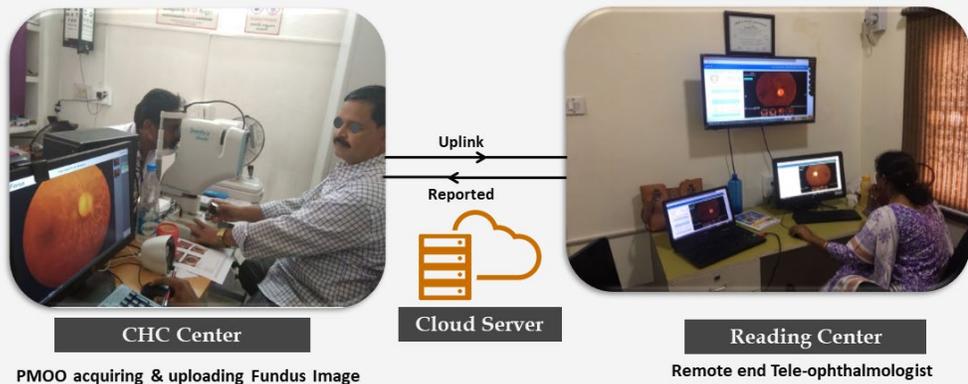
<http://www.thehindu.com/news/national/andhra-pradesh/naidu-launches-cm-eye-service-centres/article22626278.ece>

<http://www.drugtodayonline.com/medical-news/nation/6550-ap-to-launch-tele-ophthalmology-clinics-in-ppp-mode.html>

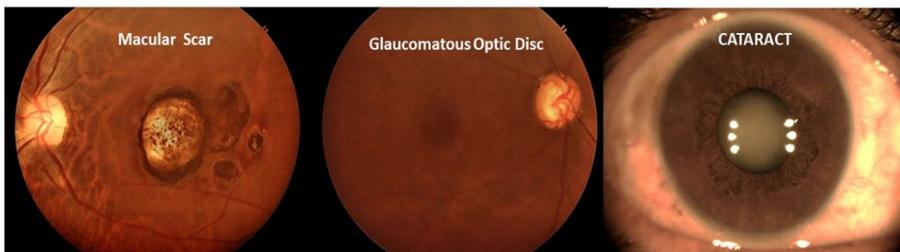
12<sup>th</sup> May 2021 : The 115 Mukhyamantri e-Eye Kendram Centres  
have already catered to over **16,57,455** patients in just  
168 weeks, in 13 districts of Andhra Pradesh.



**Fig 09 Fundus Image Transmission**



Sample of fundus images evaluated remotely @ Chennai sent from Andhra Pradesh



**Fig 14 Patients referred to Higher Centers**

WELCARE Health Systems  
REMOTE HEALTH CARE

CHC, TIRUVURU KRISHNA DISTRICT, Andhra Pradesh, 521225, India

PATIENT NAME :

PATIENT ID :

DATE & TIME : 01-08-2018

AGE & GENDER :

### TELEOPHTHALMOLOGY REPORT

RIGHT EYE

LEFT EYE

## Fig 13 Fundus report Illustration

**OBSERVATIONS**  
 BOTH EYES – BOTH EYES SEVERE NPDR CHANGES NOTED WITH MACULOPATHY  
 RIGHT EYE – HARD EXUDATES, MACULOPATHY +  
 LEFT EYE – HARD EXUDATES, CIRCINATE PATTERN, MACULOPATHY

**REFERRAL NOTE:** ADVISED REFERAL TO HIGHER CENTER FOR FURTHER EVALUVATION (OCT, FFA) AND MANAGEMENT

**REFERRED TO:** GENERAL OPHTHALMOLOGIST,AH-Nizvidu

## MAK Services Snapshot – Apr 2021



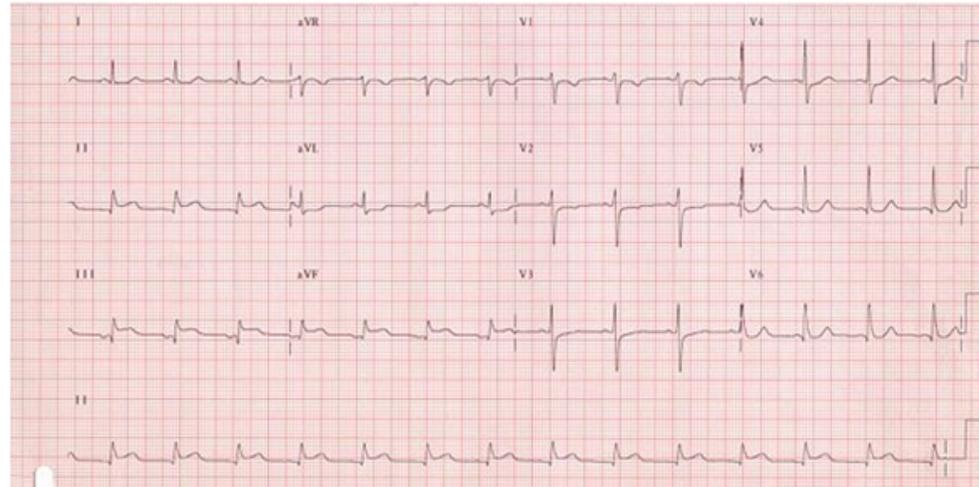
REMOTE  
HEALTH CARE

Parameter	Mar '21	Apr '21	Cumulative
TOTAL CONSULTATIONS	1,97,714	2,05,681	1,36,77,521
GENERAL OP CONSULTATIONS	1,83,235	1,92,241	1,24,91,412
SPECIALIST TELECONSULTATIONS	14,479	13,440	11,86,144
UNIQUE PATIENTS TREATED	1,45,250	39,039	31,99,845
LAB REFERRALS	28,977	26,293	21,53,033
LAB TESTS	91,263	80,801	85,07,289
ANC VISITS	11,774	10,230	5,72,627
IMMUNIZATION VISITS	26,399	19,919	13,35,496

65 Yr. male (Mr. RS- RM01.0000001035), came to Telemedicine OPD, CHC- Keylong on Saturday, 8<sup>th</sup> August around 3.45 PM with severe chest discomfort. Coordinators recorded: Pulse-45, BP: 110/60, ECG taken immediately reviewed by ER Specialist at Chennai at 4.02PM. Vitals checked again- PR - 57/Min, BP 90/60mm Hg

Local doctor asked to look for signs of failure & start IV fluids followed by Disprin 325mg stat, T.Atorva 80mg, T. Clodipogrel 300mg stat & Tramadol 50 mg slowly with Emset. PR - dropped to 46/min, SPO2 -94%. Repeat **ECG showed ST elevation in Leads II, III & aVF with reciprocal changes in chest leads** suggestive of Inferior Wall MI. After ruling out contraindications, immediate **Thrombolysis** with Streptokinase was done at the remote centre telementored by the ED consultant.

Youtube link for Ram Singh Video: <https://m.youtube.com/watch?v=qAed7Vz8Z3A>



# What makes eUPHC unique

## Front Runners

- First **Digital PHCs in India**
- First PHCs to be converted to **Health & Wellness Centers**
- Phase I – 164 centers **ISO 9001** certified
- Providing **Continuum of Care** through eUPHC

## Innovations

- Paperless eUPHCs
- Data storage in cloud servers to achieve data privacy
- Real-time dashboard availability for KPI monitoring
- Resources trained in person & virtually
- CDSS and Triage software used
- Usage of Internet Of Things (IoT) & Internet Of Medical Things (IoMT)

## Resource Utilization

- 8 hours of availability of Medical Officer
- 365 days availability of services
- Full working hours availability of laboratory & pharmacy
- Real Time attendance monitoring for 1100+ resources



## Operational Efficiency

- **99% uptime** of services
- **Lab test** results delivered within **2 hours**
- Tele-consult **TAT of 15 mins**
- Neat and clean centers across both zones
- Daily availability of ANC & Immunization
- Upgraded infrastructure with complete digital connectivity

## Quality Mgmt & Improvement

- More than 80% doctors are maintaining above benchmark clinical quality
- External quality assurance for Labs with CMC, Vellore
- FDA & CE Equipment in laboratories
- KPI developed by Postgraduate Institute of Medical Education & Research, Chandigarh

## Impact Created

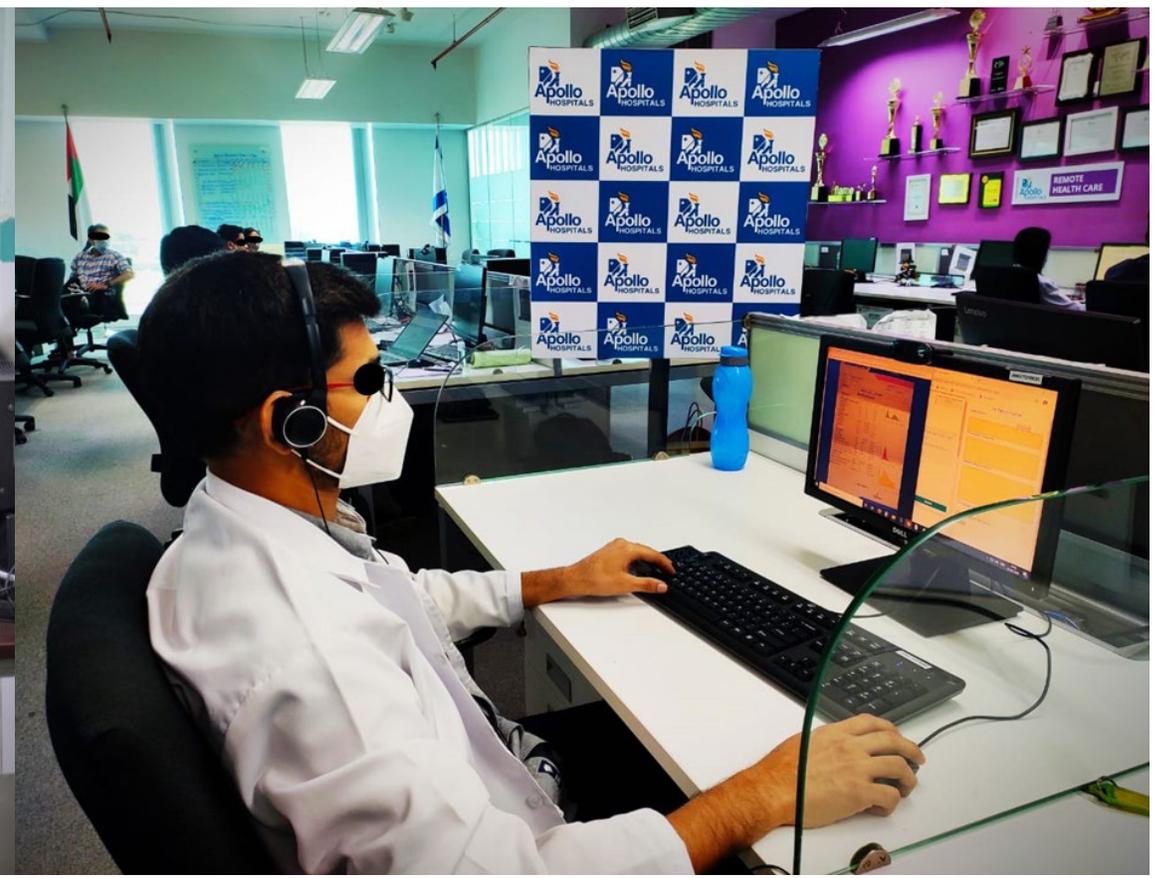
- 18% of catchment area catered by eUPHCs
- 20 Lac lives touched in close to 3 years of operation
- 77 Lac of OP visits
- 7.8 Lac Specialty Tele-consults
- 50 Lac Lab tests delivered

# MAK Awareness Activities





Entries in EMR made by paramedic



# Tele Consults & HUB



# Economic Viability of Tech enabled Remote Health Care

- Calculated Cost 728.20m INR ( 10m US \$) on Lab tests mean cost per test ₹ 3807 (51US \$). Actual cost incurred ₹ 584.84m (8 m US\$) @ UPHC's mean cost per test ₹946 (12.8 \$)
- Only 31% of tests available @TeRHC centres available in PHC's
- Lab tests cost 28.84% of that in private labs
- Cost per specialist teleconsultation @PHC ₹ 165 ( US \$ 2.2)

*Ref: Ganapathy K, Das S, Reddy S, Thaploo V, Nazneen A, Kosuru A, Shankar Nag U. Digital Health Care in Public Private Partnership Mode. Telemed J E Health. 2021 Apr 5. doi: 10.1089/tmj.2020.0499. Epub ahead of print. PMID: 33819433.*



# Modi urges more doctors to offer telemedicine services

He says people in villages and in home isolation will benefit

SPECIAL CORRESPONDENT  
NEW DELHI

Prime Minister Narendra Modi on Monday interacted with doctors across the country dealing with the second wave of the pandemic, urging them to include oxygen audits, forming teams to provide telemedicine services to those undergoing home isolation and in rural areas and the new challenge of mucormycosis.



Narendra Modi

medical fraternity, but the faith of citizens stands with you in this fight," he is reported to have told the doctors.

The meeting, held over video conferencing, saw the Prime Minister also stressing on psychological care along with physical care. "This long battle against the virus must be challenging for the

He appealed to doctors to form teams for telemedicine, train final year MBBS students and interns to en-

sure that all tehsils have telemedicine services, and that home isolation should be guided by SOPs (standard operating procedures). He briefed doctors on the efforts being made to ramp up capacity of medical resources required, and said vaccination of health care workers had paid dividends in terms of safety. The doctors shared best practices and their experiences through both the waves of the pandemic, including proper and improper use of medicines.

The meeting was attended by NITI Aayog members and Health Secretary Rajesh Bhushan.

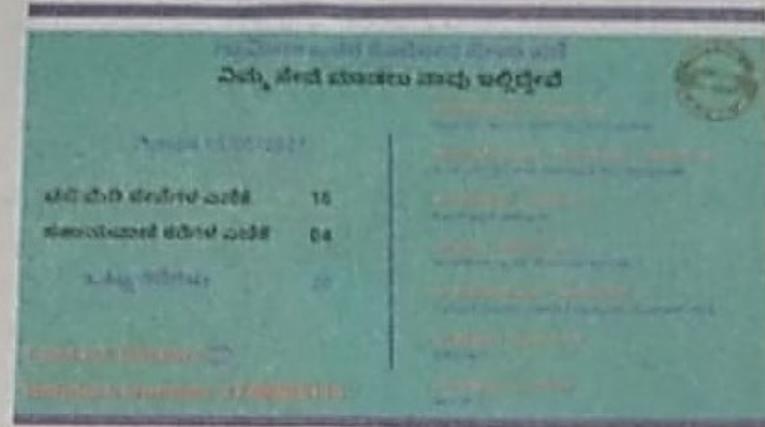
# A telemedicine initiative by farmers

It aims to help in early diagnosis and treatment

SPECIAL CORRESPONDENT  
MYSURU

The surge in COVID-19 cases in rural areas and the lack of adequate beds in hospitals have led to some out-of-the-box thinking from a group of farmers to make consultation available by phone.

This is resulting in early identification of symptoms and commencement of



www.telangana.gov.in



helpline as there were no doctors or private health facility in his vicinity. The doctor who attended to the caller learnt of the symptoms and prescribed the medicines, besides advising him to take rest. He recovered totally and called back to express his gratitude," said Mr. Shanthakumar.

Another farmer, from Jayapura, cited his symptoms and the doctors called him for testing before commencing treatment.

"In a crisis period, timely advice and information

# Tele-medicine service for those in home quarantine starts today

Corporation hires 135 doctors to offer assistance to COVID-19 patients

SPECIAL CORRESPONDENT  
CHENNAI

Starting Saturday, doctors will provide tele-medicine services to all COVID-19 patients under home quarantine in the 15 zones of the city.

Corporation Commissioner Gagandeep Singh Bedi on Friday announced that 135 doctors had been hired for a period of three months. A total of 300 doctors would be hired to provide tele-medicine services for over 30,000 COVID-19 patients in home quarantine. The remaining doctors were expected to join shortly.

Each doctor is expected to call patients at least once a day to provide the services free of cost. According to data compiled by the Greater



Adequate manpower: A total of 300 doctors will be hired to assist over 30,000 COVID-19 patients in home quarantine.

Adyar zone, which was the first professionally managed facility among the 15 zones. Other zones will start call centres shortly. Over 8% of patients in home quarantine were found to be depressed and have received counselling from psychologists.

The civic officials have started taking initiatives to

Centres are vacant and such beds will be used to isolate them.

Corporation South Region Deputy Commissioner Raja Gopal Sunkara said the first zonal call centre had been set up at the Adyar zone office, with 24 callers for each of the two shifts. The call centre at the zones had facilitated in the identifying of

whether focus volunteer had visited, whether symptoms had reduced or worsened and whether sanitation has been done or not. It gives feedback about the Corporation's work. Doctors will join the call centre on Saturday," Mr. Sunkara said.

Mr. Bedi on Friday ordered special vaccination camps at 152 locations to cover at least one lakh residents in three days. Over 11.42 lakh first doses and 5.06 lakh second doses had been administered so far. Kiosks were set up at 100 locations to distribute masks to the city residents.

He visited the Injambakkam hospital and inspected oxygen beds. Three such facilities in Injambakkam, Tondiarpet and Nandambakkam have oxygen beds.

The Chennai Trade

# Nursing homes will get free access to COVID-19 experts

SPECIAL CORRESPONDENT  
CHENNAI

Apollo Hospitals has launched a free tele-access

will prevent them from adopting unproven therapies and empower them to offer the correct evidence-

# Corporation begins telemedicine services

135 doctors have been recruited for the purpose

SPECIAL CORRESPONDENT  
CHENNAI

The Greater Chennai Corporation on Saturday launched telemedicine services for COVID-19 patients on home quarantine in all zones of the city.

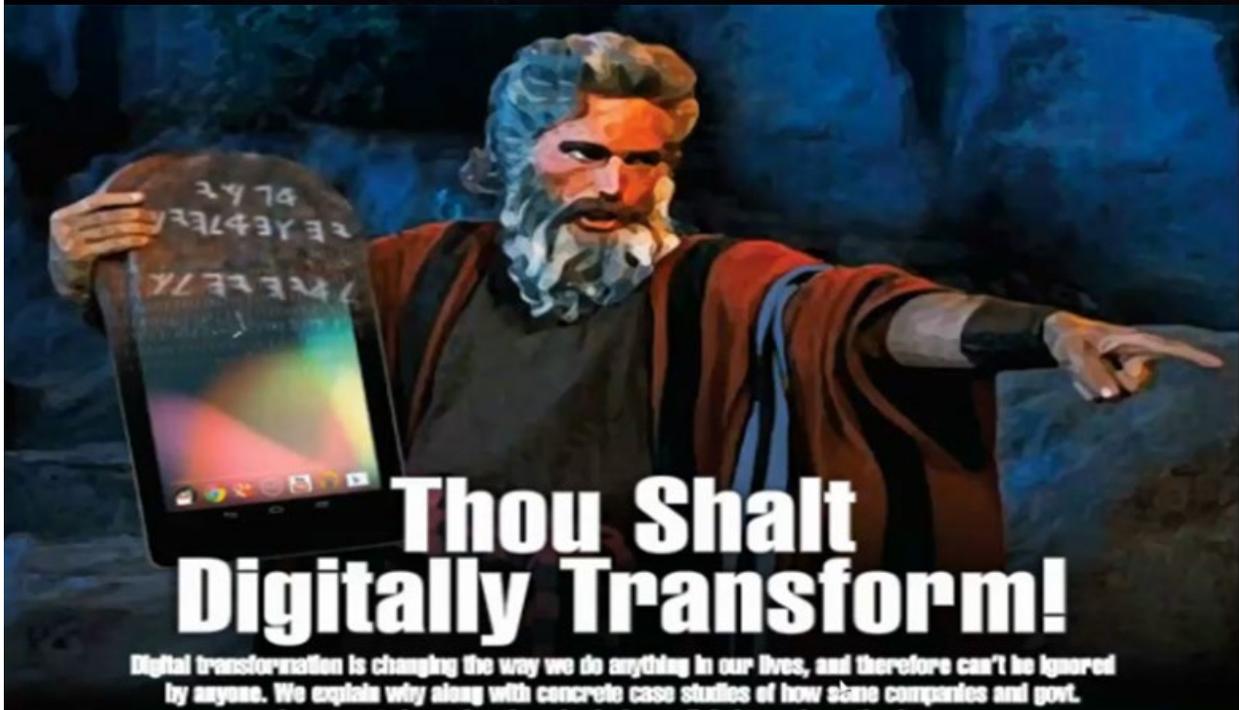
of Parliament Dayanidhi Maran and Thousand Lights MLA N. Ezhilan.

According to the data compiled by the Corporation, around 4% of the patients on home quarantine required treatment at hospitals. At least 14% of the pa-

ty assistance. The Corporation doctors would monitor all aspects of home quarantine, including medicine, food, isolation, sanitation and emergency support. Disposal of waste in yellow bags from patients on home quarantine would be

**The Govt, administration, every stakeholder of the Health Care ecosystem in INDIA has realized, accepted that social distancing is here to stay . ICT is as important as O2 and Hospital Beds, Indian Healthcare is becoming DIGITAL !!!**

YOU CAN IGNORE REALITY, BUT YOU CAN'T  
IGNORE THE CONSEQUENCES OF IGNORING REALITY



The nicest thing about the future is that it  
always starts tomorrow

The future is always ahead of schedule

“The future a’int what it used to be”  
– Mark Twain