

प्राथमिक रुवायश्य केन्द्र  
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# **Role of Artificial Intelligence, Telemedicine & Electronic Health Records in re-shaping healthcare in Primary Health Centers in India**

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# INTRODUCTION

Primary Health Centers (PHC) are the initial building block of primary healthcare

Major role in providing primary health care to the population or community they cater to

Primary Health Centers (PHC) is envisaged as social models of healthcare service delivery for all

Technologies like **Artificial Intelligence, Electronic Health records** and **Telemedicine** have been adopted globally to improve and make the for primary healthcare practice more effective

Technology has been seen to have many advantages in making the healthcare delivery more efficient and effective

This report aims to understand the role of AI, EHR & Telemedicine in Primary Healthcare.

And the current scenario of AI, EHR & Telemedicine in the Primary Healthcare Centers in India.

# OBJECTIVES

## **Specific Objective:**

To understand how Electronic Health Records, Artificial Intelligence and Telemedicine will help in improving the challenges in primary care in India

## **General Objectives:**

1. To understand the application of healthcare technology in primary healthcare for filling the existing gaps in the Primary Healthcare Centers.
2. To understand the present gaps in Artificial Intelligence, Electronic Health Record and Telemedicine at the level of PHC.

# METHODOLOGY

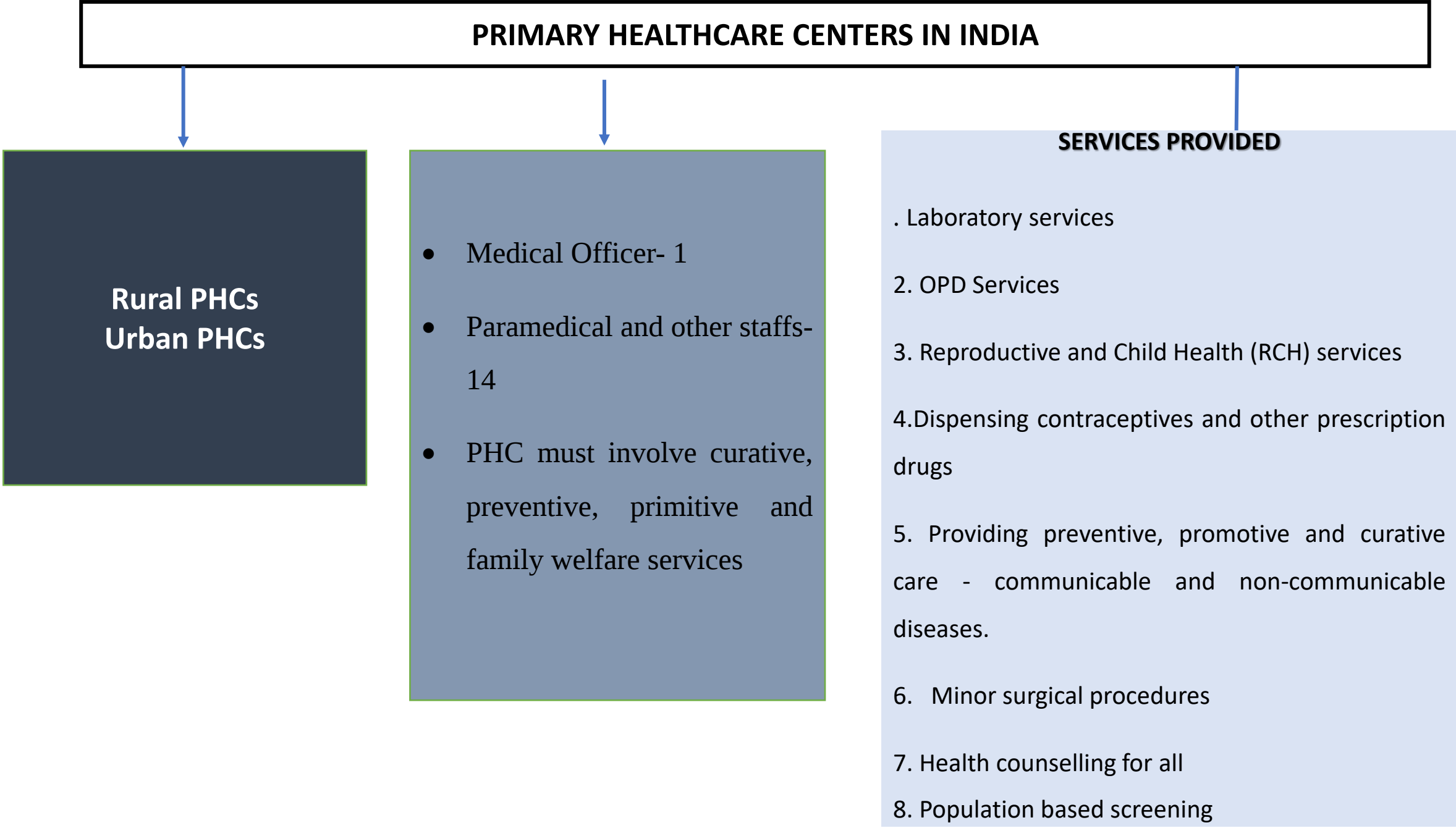
## **Study design** – Descriptive study

- **Data source** – Research articles (using Google scholar & PubMed), Government Websites (for secondary data)
- **Data Collection and Analysis**- This study is based on review of past studies, reports, and other refereed articles. The primary information on which the researched report is premised is sourced from various studies and Government website. The information from such sources have been assessed, structured and analyzed to understand the role and gaps of EHR, AI and Telemedicine in Primary Health Centers.



# Primary Healthcare Centers Present Scenario

## PRIMARY HEALTHCARE CENTERS IN INDIA



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graph TD; A[PRIMARY HEALTHCARE CENTERS IN INDIA] --> B[Rural PHCs<br/>Urban PHCs]; A --> C[Medical Officer- 1<br/>Paramedical and other staffs- 14<br/>PHC must involve curative, preventive, primitive and family welfare services]; A --> D[SERVICES PROVIDED<br/>1. Laboratory services<br/>2. OPD Services<br/>3. Reproductive and Child Health (RCH) services<br/>4. Dispensing contraceptives and other prescription drugs<br/>5. Providing preventive, promotive and curative care - communicable and non-communicable diseases.<br/>6. Minor surgical procedures<br/>7. Health counselling for all<br/>8. Population based screening];
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**Rural PHCs**  
**Urban PHCs**

- Medical Officer- 1
- Paramedical and other staffs- 14
- PHC must involve curative, preventive, primitive and family welfare services

### SERVICES PROVIDED

1. Laboratory services
2. OPD Services
3. Reproductive and Child Health (RCH) services
4. Dispensing contraceptives and other prescription drugs
5. Providing preventive, promotive and curative care - communicable and non-communicable diseases.
6. Minor surgical procedures
7. Health counselling for all
8. Population based screening

## PRIMARY HEALTHCARE CENTERS IN INDIA

### MACRO CHALLENGES

- Poor Infrastructure
- Lack of adequate medical resources & Amenities
- Does not offer comprehensive

### MICRO CHALLENGES

Healthcare providers  
unwilling to work in  
PHCs

Vacancy in PHCs

Strained relation and  
communication between  
doctor & Patient

Less patient  
referrals

Out- patient healthcare services get affected

Patients seeking healthcare services in private  
health facilities

PHC unable to serve as  
the first link of access  
to primary care

Increasing Global  
Burden of Disease

Increasing Out of  
pocket expense on  
healthcare

Inaccessibility to  
Healthcare

# HEALTHCARE TECHNOLOGY APPLICATIONS

# STATUS OF AI, EHR & TELEMEDICINE IN PRIMARY HEALTHCARE

## Decision making

### AI

- Analysis of the healthcare data.
- Decision support, image analysis and patient triage.
- Collection and structuring of large complex data.
- Helps with the understanding of disease pattern and surveillance

### EHR

- Efficient work flow of the PHC
- Accept orders, enters prescriptions faster
- allows to store the data for future follow ups.
- Enables data exchange

### TELEMEDICINE

- Disease management
- Upskilling of staff- e-education, e-conferencing, etc.
- Educational tool- teleproctoring
- Healthcare management

# Early Diagnosis of Diseases

## EHR

- Data stored in EHR- Analyzed to understand the disease pattern
- Disease surveillance

## AI

- Decision support- Image analysis & patient triage
- Predictive modelling for early detection of diseases.

## TELEMEDICINE

- Disease management- asthma, diabetes mellitus, hypertension and when accessibility to healthcare service is challenge.
- Teleclinics & mobile health clinics
- Telehealth in specialty- cardiology, tele- psychiatry, tele-cardiology and tele surgery
- Diagnostic services

# Patient referrals

## EHR

- Timely and faster exchange of data between authorized healthcare providers.
- Systems be digitally connected with other medical devices:- enables remote monitoring of the patients

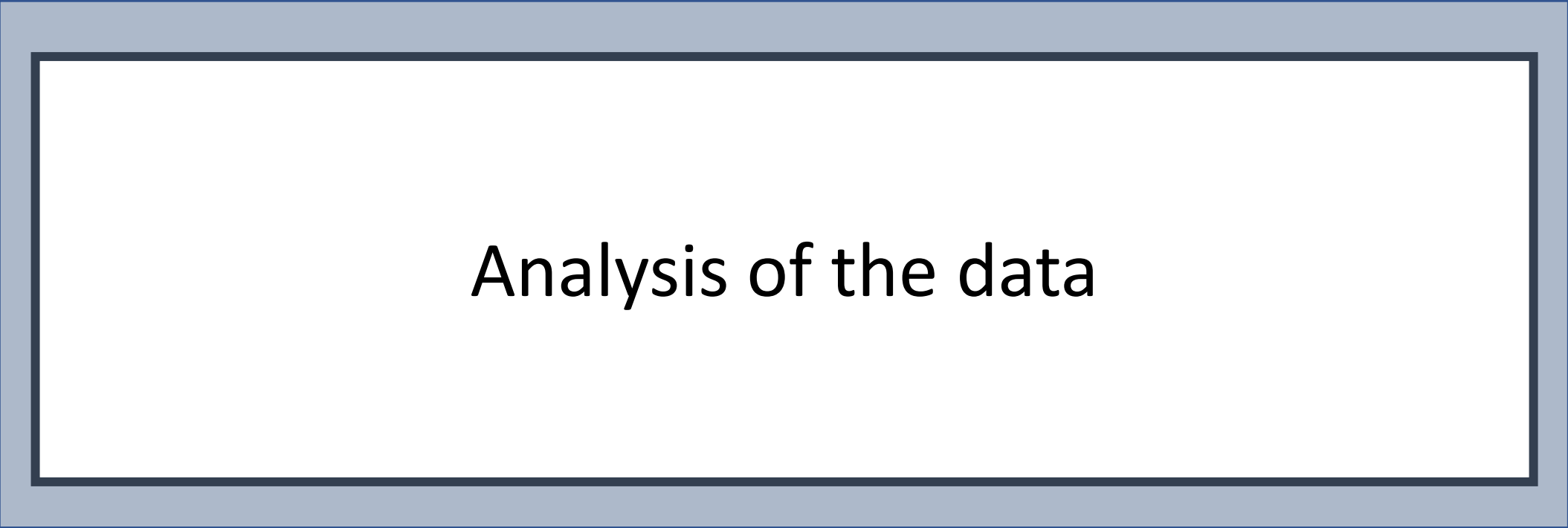
# Human resource management

## EHR

- EHR enables the referral system
- EHR as a link between various departments and units.

## TELEMEDICINE

- Enables remote monitoring of the patients
- Enables patients to access healthcare from anywhere in the world



Analysis of the data



## ARTIFICIAL INTELLIGENCE

Patient doctor distance- E- Referral Systems between units and department

Effective workflow links- timely management of cases

AI & ML- Precision medicine

Early diagnosis and detection of Diseases

Big data analytics- Structuring of data- This data utilized in disease surveillance & disease dynamics.

AI with EHR- improves work flow, quick and effective decision making

Deep learning used along with AI- to detect early stages of diseases. – TB detection (diagnostic), Long short term model- heart failure early detection



Requires regulatory approvals, continuous quality checks

For advanced settings- Initial costs

Acceptance by users and early adoption – requires deep



Primary care treatment & diagnosis- hypertension, bronchial asthma, etc.

Can effectively provide patient- provider communication

Telemedicine can be used for decision support- Tele-conferencing, Tele-education, & more.

Widely adopted for Remote monitoring of patients- communicable disease.

## TELEMEDICINE

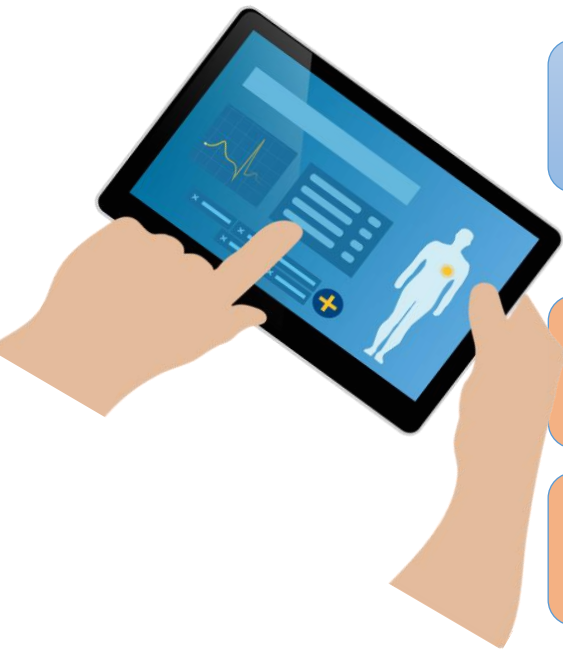
Adoption limited – lack of awareness

Can address all primary care problems but cannot replace a human touch during emergency

Evaluation of the quality of care required, implementation challenges like the cost and internet connectivity in Rural India.



# EHR



**Capturing Health and sharing of data, advance processes – Decision support**

**AI alongside EHR- analysis of data → Early detection of diseases & reduce global burden**

**Improve work flow using AI → data and time management**

**E-Refferals alongside medical device connectivity software → Linking units and department**

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**Limited Adoption in India, Interoperability issues**

**Poor infrastructure, cost of implementation remains a challenge**

**Data privacy issues**

# GAPS IN TECHNOLOGY IMPLEMENTATION IN PUBLIC HEALTHCARE CENTERS

Unavailability of doctors & other staff



Poor infrastructure of the Primary Health Centers

No internet connection in most regions of rural India



Stringent policies for data interoperability and data sharing

Awareness among patients especially in rural India and required skill set among staff



Acceptability for technology among staff and patients

# RESULTS & CONCLUSION

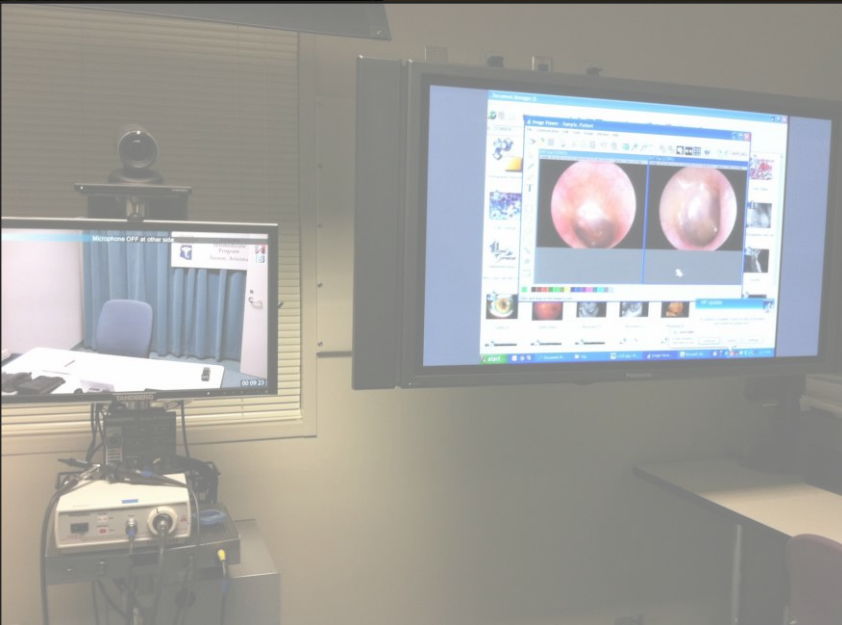
EHR, AI & Telemedicine has the potential to fill the existing gap in PHCs in India. But these technologies are not the end solutions to the existing challenges in Primary care in India.



Healthcare technology is used to address many challenges but it is moreover used for improving the current healthcare system rather than replacing them. Healthcare technology is the future of an effective and efficient primary healthcare system in India.

Require a stronger infrastructure to operate, hence they can only be a solution to the micro challenges existing in the primary health centers in India. Whereas, the macro challenges will have to be dealt from the grass root level by policy makers and regulatory bodies.





*Thank You*

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