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# PROPOSED MOBILE CELLULAR COMMUNICATION MODEL FOR HEALTH MONITORING IN HIMACHAL PRADESH

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## ABSTRACT

As we know mobile and wireless technologies are contributing in development of states, countries and world in many ways .This paper proposes the implementation of mobile in health services in the remote areas of HP. This paper presents the penetration of mobile in the developing countries and their use in the health sector. This paper gives a model of health using mobile cellular communications in the health services. This paper proposes that how the portable biomedical equipment's and telecommunication systems can be combined to provide health services in remote areas with improved patient safety, reduced cost and challenges in doing this.

**Keywords**: PBI, mHealth

## INTRODUCTION

Cellular Communication

Mobile has created a new boom in the society. The number of mobile phone subscriptions worldwide has reached 4.6 billion and is expected to increase to five billion by 2010.Mobile phone providers in rich countries offer advanced services and handsets, while people in developing countries increasingly use the mobile phone for health [3].

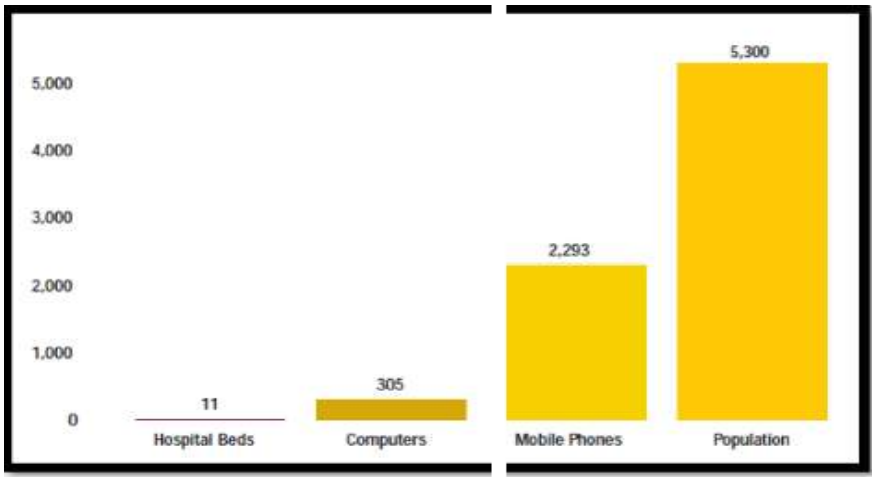


**Fig. 1. Technology and health infrastrructure statistics for developing countries (in millions) [United Nations Foundation ,2009]**

So we can use this system for the improvement of the health of people. Fig.1 shows the technology and health infrastructure for developing countries.

**Medical facilities in Himachal Pradesh[4]**

| Average rural population covered | Type of Health centre |
|---|---|
| 2952 | One sub center |
| 13615 | One Primary Health Centre |
| 83739 | One Community Health Centre |

## RESEARCH METHODOLOGY

Himachal Pradesh

Himachal Pradesh is a state in the north of India having area of 55673 km square. Having total population of 6856509. Having census villages 20690 and inhabited villages 17495

rural population 6167805 and urban population 6,88,704. There are 12 distrcts in HP. These are Kangra, Hamirpur, Mandi, Bilaspur, Una, Chamba, Lahul and Spiti, Sirmaur, Kinnaur, Kullu, Solan and Shimla. There are two medical colleges in HP RPMC Tanda, kangra and IGMC Shimla[4]

mHealth Model

All districts will be divided into two groups i.e group-1 and group-11. These groups are divided on the basis of distance between particular districtand themedical college. Group -1 is connected with the medical college kangra and the group -11 is connected to IGMC Shimla.

**Group –I**

Kangra,Chamba,Hamirpur,Mandi,Una and Kullu

**Group-II**

Shimla,Sirmour,Kinnuaur,Bilaspur,Laul and spiti, and Solan

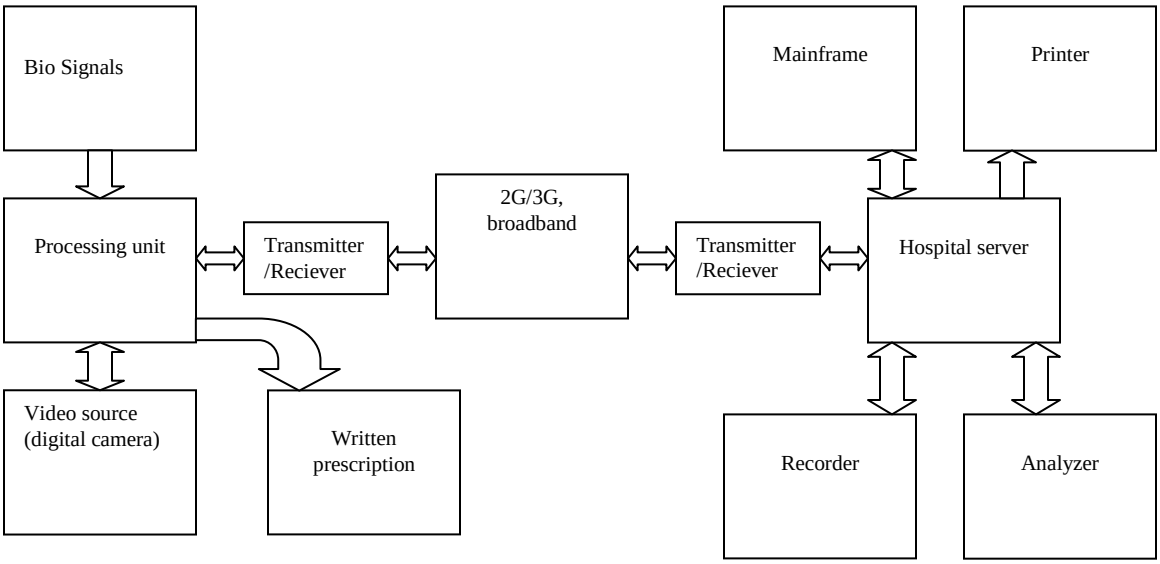


**Fig.2 Block diagram of model**

**Patient identification**

Every patient will be detected by fingerprint biometric. When patient enters the finger in the biometric patient whole record will be displayed on the screen. In addition to it patient will be given a identification number e.g 16890, 46723 rtc.

**Bio signals**

Biosignals are the signals received from the portable biomedical instruments. In case we can measure patient temperature , BP, Pulse etc.

**Video source**

In case of 3G we can transmit video signal also which can help the doctor in proper diagnosis. In other case we can send the clip of the patient using MMS.

**Printer**

Printer is one of the most important part of this model. Printer is used on both sides at the remote end and the hospital end for the printing purposes. Prescription will be given in the printed form to the patient.

**Analyser**

Analyser here is a specialist doctor who has to diagnose the patient problem and give the prescription according the patient conditions.

**Main frame**

Mainframes are mainly a powerful computers used by corporate and governmental organizations for big applications, bulk data processing. Here it is used for the storage of data i.e electronic health records.

**EPR**

An electronic health record (EHR) which is sometimes also called as electronic patient record (EPR) is a concept which can be defined as an organized and systematic collection of patient's health information electronically. It is a record in digital format and is capable of being shared across different health care units with the help of network connected information systems. These records generally include a whole range of data including their basic details or demographics of patient, their medical history, medication status, allergies, laboratory test

results, radiology images, vital signs or symptoms of the disease [2].

**Realibilty**

Realibility is the main requirement of the system. There is lot of error in the measurement system. There is error due human interference We will make the data more reliable. We will make the system more secure so that no body can easily access or disturb the data. The data will remain secure. There will be locks for the security of the whole system. For checking the realibilty model is required. Model will be developed according the equipment / instruments used in the whole system [4].

**Security of data**

Security of data is the demand of time. We should make our data more and more secure. Our data should be very much secured .various layers and types of information security control are appropriate to databases, including Access control,Auditing,Authentication,Encryption, Integrity controls,Backups,Application security.But in this system access control, backups and application security will be used [4].

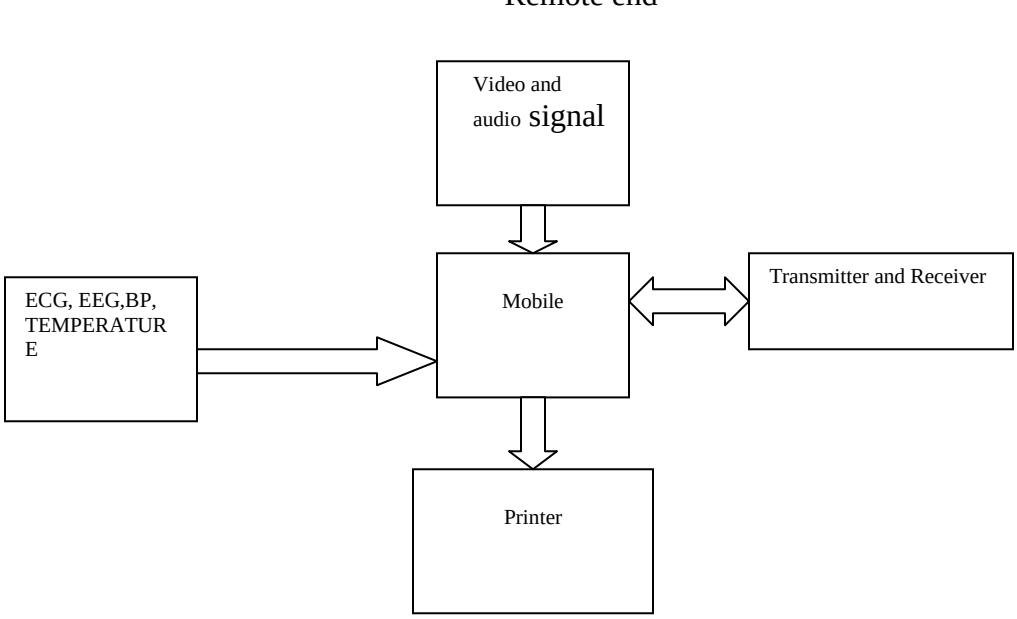


**Fig.3 Remote end system**

This diagram shows the interface of mobile with PBI's. This system will be available with the patient. After take basic reading of the patient data will be send to the hospital on doctor and operator mobile using sms, mms, image, e-mail etc.

Hospital end

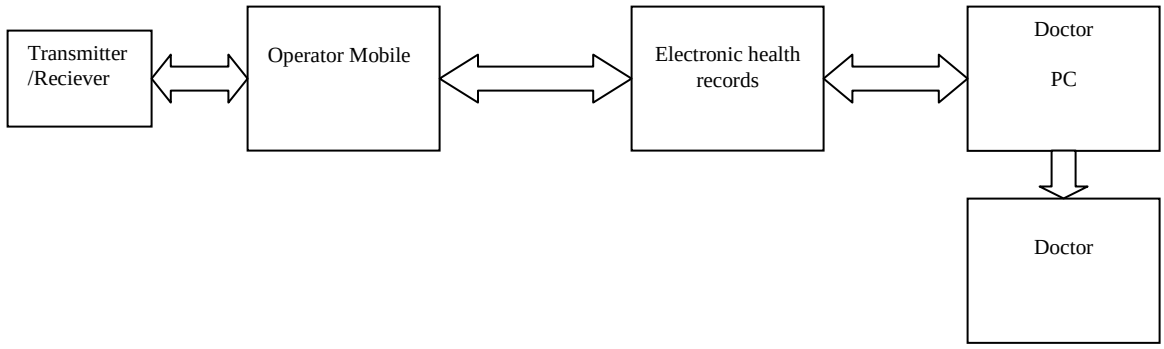


**Fig.4 Hospital end system**

At the hospital operator will upgrade the EPR at the hospital server. Operator will receive the data from patient and the doctor and upgrade the data base.

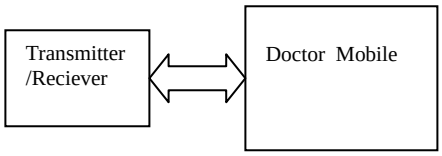


**Fig.5 Doctor's module**

Doctor will receive the data of patient, checks his history on his computer and reply his suggestions to patient and the operator. Operator will again upgrade data on the data base.

All these data's can be send to doctors on doctors mHealth module like mobile, tablet PC etc[2].

Communication link

2G

2G (or 2-G) is short for second-generation wireless telephone technology. Three primary benefits of 2G networks over their predecessors were that phone conversations were digitally encrypted, 2G systems were significantly more efficient on the spectrum allowing for far greater mobile phone penetration levels, and 2G introduced data services for mobile, starting with SMS text messages.2G has been superseded by newer technologies such as 2.5G, 2.75G. 2G networks are still used in many parts of the world.[4]

3G

Third generation mobile is also available in various cities of HP. We can use 3G dongle for having internet facilities at village end. 3G or 3rd generation mobile telecommunications is a generation of standards for mobile phones and mobile telecommunication services fulfilling the International Mobile Telecommunications-2000 (IMT-2000). Its services include wide-area wireless voice telephone, mobile Internet access, video calls and mobile TV, all in a mobile environment.

To meet the IMT-2000 standards, a system is required to provide peak data rates of at least 200 kbit/s (about 0.2 Mbit/s). However, many services advertised as 3G provide higher speed than the minimum technical requirements for a 3G service. Recent 3G releases, often denoted 3.5G and 3.75G, also provide mobile broadband access of several Mbit/s to smartphones and mobile modems in laptop computers[4]

**Whole processes**

Patient:

Patient has to go to the hospital. He has to fill the form in the hospital. That form is given to the receptionist. Receptionist will give a slip to the patient on which following information will be given.

Registration: Name :Raj Kumar
patient mobile: 9817289654
Patient id: 13572
Server mobile number: 9716500000
Doctor name: Dr Rajesh
Doctor mobile number: 9416500000
The doctor number will vary according to the specialization of the doctor.

**Doctors**

| Doctor name | Mobile number |
|---|---|
| General physician | |
| Dr. Ram | 94xxxxxxxx |
| Dr. Sham | 94xxxxxxxx |
| Cardiologist | |
| Dr. Sonu | 94xxxxxxxx |
| Dr. Mohit | 94xxxxxxxx |
| Surgeon | |
| Dr. Rana | 94xxxxxxx |
| Dr. Jeet | 94xxxxxxx |

After first meet patient has to be in touch with doctor for post operative treatment. Patient will send the data to the doctor's mobile and operators mobile. Operator will upgrade the data in the EPR. The will reply his suggestions to both operator and the patient. The ERP will be available on the doctor PC in the hospital.

Mobile Interface

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In this system interface will be developed. Using this interface signal can be read on mobile and transmit the reading on the mobile of doctor and the hospital operator [5].

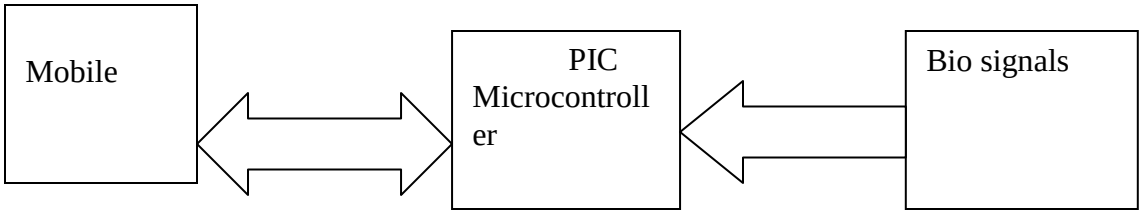


**Fig. 6 Mobile interface**

## DISCUSSION

Merits

- This system will help us to provide medical facility in every village of the state.
- This system will provide job to opportunity to local people
- This system will help in checking the number of patients of particular disease like HIV, cancer, Polio etc.
- This system will help in removing various from the world.
- Patient does not need to revisit doctor
- This system will remove the chance of human error in the system

Demerits

- Used only for pre and post operative treatments
- If data is wrong then prescription will be wrong
- Some technical knowledge is required to the patient

## CONCLUSION

As wireless technologies has created a revolution in the society. This system can be used to make world free from diseases. It can be used to remove epidemics from the society. This concept can be used for developing for improving health sector. This model can be used in the other parts of the country. This model can be used to improve health facility in other developing countries also. This concept can be further converted into virtual hospitals.

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