eHealth model for Himachal Pradesh

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Abstract: This paper presents a electronic health set for HP. This can be a good option for providing medical facilities in rural area of the HP.As internet plays a main role in the infrastructure of India. Internet can be used to enhance medical facilities in the rural India. This paper proposes a complete model for HP using internet. This model can be call as ehealth model for HP.
Key words: PBI,EPR

1. Himachal Pradesh

Himachal 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 twelve district of HP. They 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

2. Medical facilities in HP

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

3. Working model

There will be two groups group-1 and group-11. These groups are divided on the basis of distance from the medical college to the concerned district. Group -1 is connected with the medical college kangra and the group -11 is connected to IGMC shimla as it is these district are near to shimla.

Group –I (Medical college kangra)
Kangra,Chamba,Hamirpur,Mandi,Una and Kullu

Group-II(IGMC Shimla)

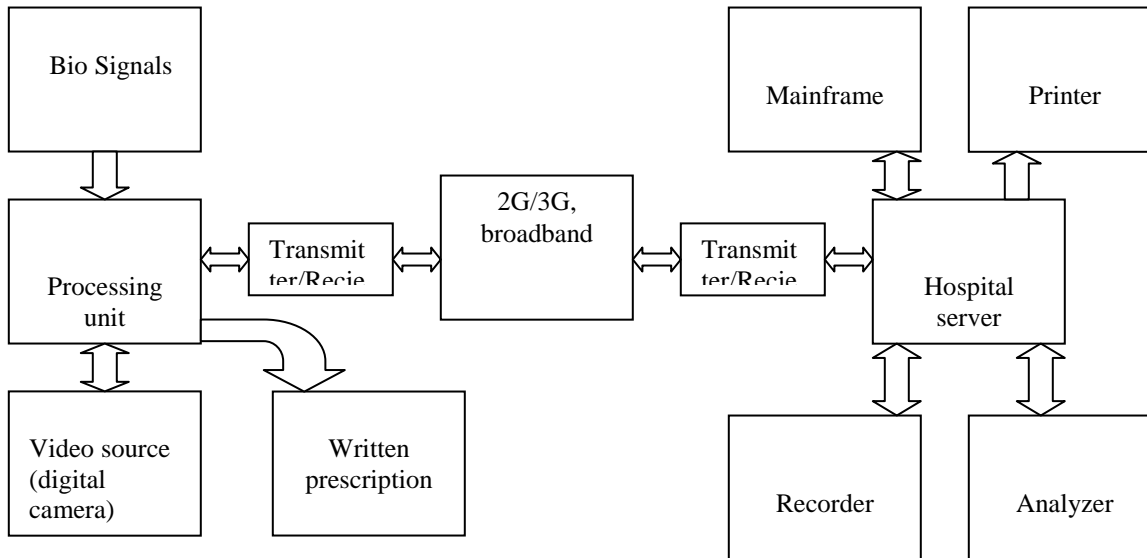Shimla,Sirmour,Kinnuaur,Bilaspur,Laul and spiti, and Solan

Block diagram of the system

Fig .1

Bio signals
Biosignals are the signals received from the portable biomedical instruments. As we can have ECG,EEG, BP and temperature measurement. We can have this measurements on the computer using various interface.

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 used on both sides at the remote end and the hospital end for the printing purposes.

Analyzer
Analyzer here is general physician who has to diagnose anemia 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
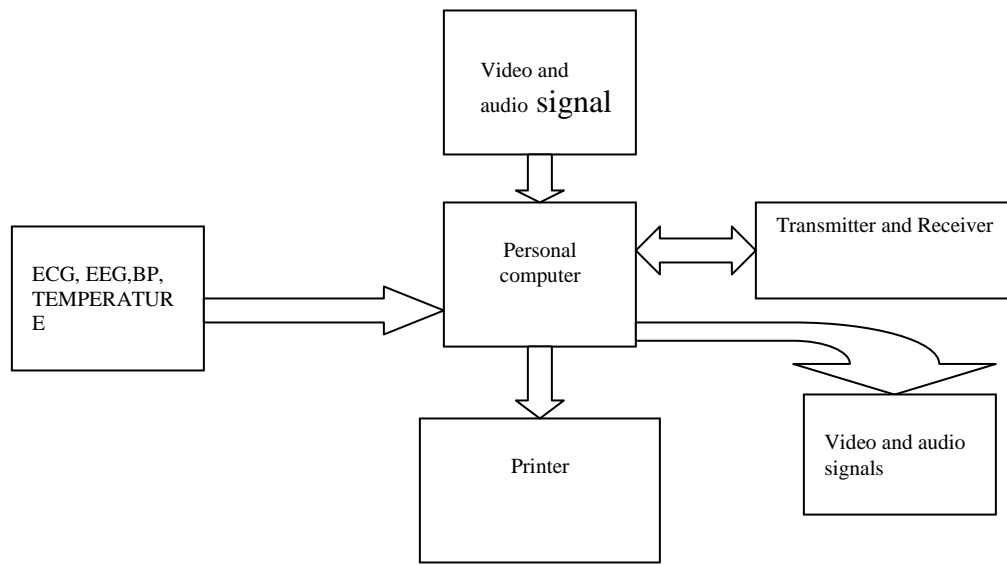An electronic health record (EHR) which is sometimes also called as

Fig.2

electronic patient record (EPR) is a concept which can be defined as an organised 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. These records will be available to the doctors on there PCs. EPR will be available in the hospital server room.

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.

Security of data

Security of data is the demand of time. 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.
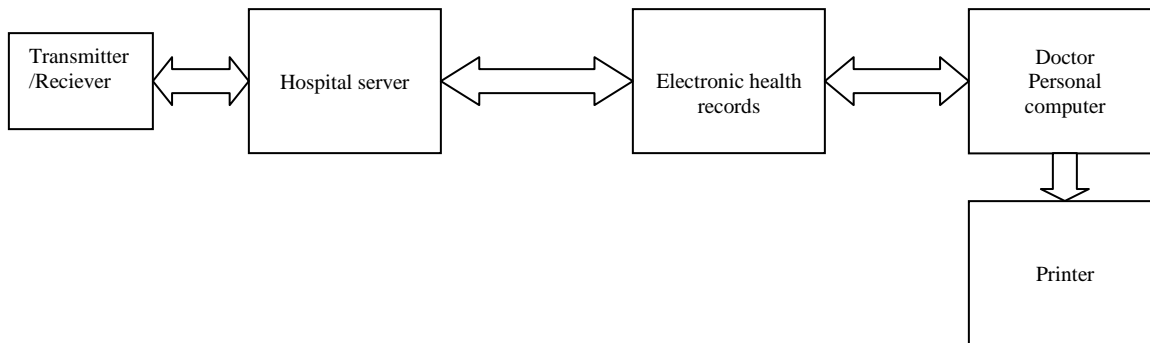

Fig.3

Village end

In village a room and a technical operator will be required. That room is installed with computer. That computer will be interfaced with ECG,EEG, BP machine, printer, webcam, speakers. That computer will be provided internet facilities through landline phone. For making this system more robust we will be having manually operated portable biomedical instruments in this

room. For internet we will having wireless internet connection (dongle) in case of broadband landline system failure. In case of failure in the interface of instruments with computer operator can mail the values of patient reading using manual PBI.

Hospital end

In the hospital a operator will be available in every department. That operator and doctor will receive the mail of the patient operator will upgrade database and the doctor will reply the mail to the operator and the patient. Operator will again upgrade the database. This database will be available on the doctors PC. Doctor can refer the database. The administrator / operator can only make changes in the database.

4 Communication link

Communication modes in the state are

Broadband:

Broadband is available with BSNL in HP. various plans of broadband are available in HP The term broadband refers to a telecommunications signal or device of greater bandwidth, in some sense, than another standard or usual signal or device and the broader the band, the greater the capacity for traffic.

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, 3G, and 4G; however, 2G networks are still used in many parts of the world.

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.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.

5 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
Mail id: raj.kumar@ehphealth.com
Password: raju
Patient id: 13572
Doctor Id: ca.01tanda@ehphealth.com
operator :op.02tanda@ehphealth.com

The doctor id will vary according to the disease which the patient is suffering from. ehphealth will be the server address hospital have to own.

After his checkup patient does not need to come back to hospital for repeated checkups.
He has to go to his village center. He has to show his slip to the operator. Then village operator will mail the current condition of the patient to the doctor and the concerned departmental operator through the patients mail id. Doctor will study his mail and will reply his suggestion to both patient and the departmental operator through mail. Departmental operator will add all these suggestions to the data base. Village operator can send patients ECG,EEG ,BP, Temperature etc record to doctor if required by doctor.

Departments
There are various type of doctors there id will be given as
General physician
Gp.01tanda@ehphealth.com
Gp.02tanda@ehphealth.com
Gp.03tanda@ehphealth.com
Oprator   op.01tanda@ehphealth

Cardiology
ca.01tanda@ehphealth.com
ca.02tanda@ehphealth.com
ca.03tanda@ehphealth.com
operator   op.02tanda@ehphealth.com

Surgery
Su.01tanda@ehphealth.com
Su.02tanda@ehphealth.com
Su.03tanda@ehphealth.com
Operator   op.03tanda@ehphealth.com

Village

Every center will get one one mail id. The id will be given below and the password will be available with the operator sitting in the village or center

Kangra.takoli@ehphealth.com
kangra.rehan@ehphealth.com
kangra.jassur@ehphealth.com

6 Shannon Law
Normally large bandwidth is required for transmission so that a large amount of data can be transmitted with high speed.. This helps reducing the cost of data transmission. Shannon's law gives the relation between bandwidth B Hz and signal to noise ratio (S/N) is given below by equation

$C = B \log 2 \ (1+S/N) bps$

Where S is the average signal power in watts and N is the random noise power in watts.

7 Managing system
There will be a centre at the population of 200 person. Every 10 centers will be headed by one person among these ten. One center among 10 centers will be opened in night. That will remain the same. Equipment will be checked every month. Maintaince staff can be called if required.Patient has to pay the nominal fee as per government norms for various tests.

8 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.
- Patient does not need to visit doctor again and again.

9 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

10 Future scope

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 concept can be further converted into virtual hospitals.

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