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Service Delivery Model in health Services through Swan in Uttarakhand

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Abstract: *The applications of e-health can disseminate the health Informatics across the globe. This paper raises the unidentified issues of e-health in Uttarakhand. In this paper we have projected the scope of health informatics in uneven geographical conditions. It refers to health services and information delivered or enhanced through existing infrastructure. In general e-health is not a technical development but also a state of mind, a way of thinking an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally and worldwide by using information and communication technology.*

Key Words: UKSWAN, SMART Phones, ISDN

I. Introduction

In this paper we have focused on primary health care (PHC) services because there is compelling international evidence about the strong relationship between primary care provision and Improved health outcomes. PHC is cost-effective and its focus on prevention and promotion is increasingly relevant in a time of rapidly rising chronic diseases and their precursors. Our goal is to outline the requirements for sustainable PHC models to service rural and remote areas of Uttarakhand [1]. Closing the gap [2] in Indigenous health status and improving distribution and equitable access to services have been identified as national priorities (NHRC, 2008). Improving access to acceptable, adequately resourced, sustainable models of PHC in rural and particularly remote areas, where health outcomes are worse and there are a high proportion of Indigenous residents, will redress the gap in health outcomes in a country that otherwise ranks well internationally in terms of its health system and life expectancy.

II. About Uttarakhand State

Uttarakhand also called the “Abode of Gods” borders Himachal Pradesh in the north-west and Uttar Pradesh in the South and has international borders with Nepal and China. The State is rich in natural resources. Uttarakhand is the 27th state of the Republic of India and was carved out of Uttar Pradesh on 9th November 2000. Uttarakhand is spread over an area of 55,845 sq. km. It has two divisions (Garhwal and Kumaon), 13 districts, 16,826 inhabited villages and 86 small towns [3]. There are only five cities with population over one lakh. It is a land of hill stations, wildlife sanctuaries and pilgrim centers. A large part of the State is hilly (93 percent) and covered with forests (63 percent). The state has thousands of small villages and hamlets in the hills with 89 % of the villages having less than 500 people. The undulating hills, tall trees filled with a variety of birdlife, and gushing streams draw tourists all the year round. Table 1 gives some details of the State’s social and demographic indicators About Uttarakhand State [3].

Table 1. Demographic, Social and Health profile of Uttarakhand in Comparison to India [4]

| S.no | Indicator | Uttarakhand | India |
|------|-----------------------------|--------------|-----------------|
| 1 | Total Population (2011) | 8.5 Million | 1021.61 Million |
| 2 | Rural Population | 7.36 Million | 830.3 Million |
| 3 | Population Density | -- | -- |
| 4 | Decadal Growth | 29.92 % | 32.66% |
| 5 | Crude Birth Rate (SRS 2007) | 20.4 | 23.1 |

| | | | |
|----|---|------|------|
| 6 | Crude Death Rate (SRS 2007) | 6.8 | 7.4 |
| 7 | Total Fertility Rate (NFHS-III) | 2.6 | 2.7 |
| 8 | Institutional Deliveries (% of NFHS) | 32.6 | 38.3 |
| 9 | Infant Mortality Rate (SRS 2007) | 48 | 55 |
| 10 | Maternal Mortality Rate (SRS 2004-2006) | 440 | 254 |
| 11 | Sex Ratio (2011) | 963 | 940 |
| 12 | Schedule Caste Population | -- | -- |

PRESENT INFRASTRUCTURE OF HEALTH SERVICES IN UTTARAKHAND

At present state the health care services are not upto mark in Uttarakhand. Due to various hindrances like geographical barriers, lack of awareness, less literacy rate etc. are some factors which are responsible for poor health service facilities in Uttarakhand.

In rural areas of Uttarakhand the health care infrastructure has been developed as a three tier system as follows [3]:

- Sub center
- Primary Health care center
- Community Health care center

Table 2 shows the availability of health care infrastructure and human resources for delivering health services at three levels in rural areas in Uttarakhand:

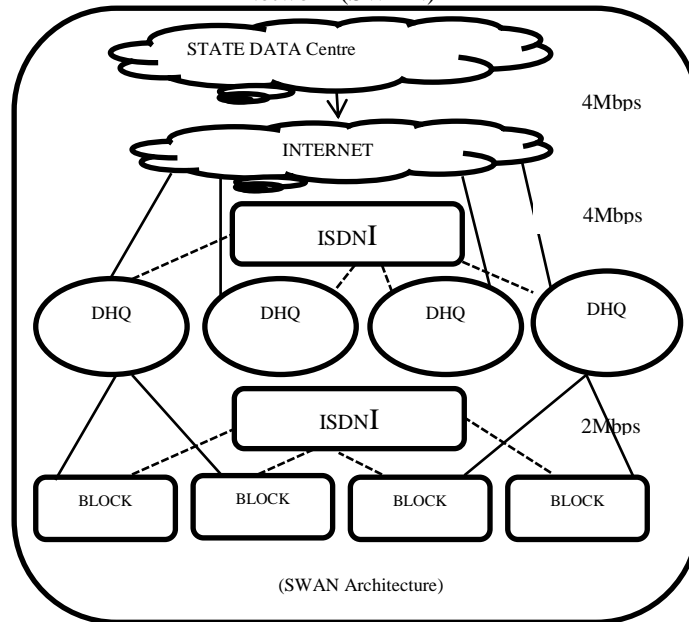
Table 2. (Source: RHS Bulletin, March 2008, Ministry of Health & F.W GOI)

| Particulars | Req. | In Pos. | Short |
|---------------------------------------|-------------|----------------|--------------|
| Sub-Center | 1294 | 1765 | - |
| Primary Health Center | 214 | 239 | - |
| Community Health Center | 53 | 55 | - |
| Multipurpose Worker /ANM | 2004 | 1903 | 101 |
| Health Worker at Sub Centers | 1765 | 616 | 1149 |
| Doctors at PHC | 239 | 866 | - |
| Obstetricians & Gynaecologists at CHC | 55 | 30 | 25 |
| Physicians at CHC | 55 | 4 | 51 |
| Pharmacist | 294 | 294 | -- |
| Radiographers | 55 | 30 | 20 |
| Nurse/Midwife | 624 | 292 | 332 |

PRESENT ARCHITECTURE OF SWAN IN UTTARAKHAND

The objective of UKSWAN is to create a state wide area network that will improve government efficiency through connectivity. The Uttarakhand State Wide Area Network (UKSWAN) [5,6] would serve as the backbone network for data, video and voice communications throughout the State which includes 1 State Head Quarter (SHQ), 13 District Head Quarters (DHQ), UKSWAN which is known as a Uttarakhand State Wide Area Network (UKSWAN) is an advanced communication infrastructure and now-a-days extensively used for exchange of Data, Voice & Video information between two or more locations, separated by significant geographical distances as shown in the fig. below.

An Overview of State Wide Area Network (SWAN)



III. Proposed Conceptual Model For Ehealth Services In Uttarakhand Through Uswan

The present state of SWAN architecture In Uttarakhand can be used by health care services to improve the present status of Telemedicine/eHealth program in the state of Uttarakhand. Existing SWAN infrastructure can be used under II phases i.e. primary phase and secondary phase for improving health care services. In the present Research paper authors have presented conceptual model for implementing the primary phase. Author’s has also discussed the issues associated with implementation of primary phase in health services through present state wide area network.

| Project Name | State Wide Area Network (SWAN) |
|---|--|
| Project Cost | Rs 76.23 Crores |
| DIT Share | Rs 7.92 Crores |
| State Share | Rs 10.87 Crores |
| ACA | Rs 6.08 Crores |
| Release(s) | DIT Rs 7.927 Cr dated 30/03/2006 ACA –I Rs 4.21 Cr dated 25/03/2006 ACA –II Rs 1.87 Cr dated 07/11/2008 State- I Rs 6.40 Cr dated 07/11/2008 State- II Rs 4.47 Cr dated 04/09/2009 |
| Expenditure (as on date) | Rs 14.39 Crores |
| Duration | 5 years |
| Project Sanctioned Date (Administrative Approval) | 29/03/2006 |
| Nodal Agency | ITDA |
| Name of Project Consultant | Nil |
| Implementing Agency | NIC, Uttarakhand |
| Project Start Date | 2006 |
| Major Milestones | - |
| Current Status | 133 out of 135 PoPs under vertical connectivity are operational. The Treasuries of the State have been connected over SWAN. |
| Refer link | www.mit.gov.in/content/state-wide-area-network-swan |

As we already aware that SWAN infrastructure is already available at block level in Uttarakhand [5]. At primary stage we can connect the sub centers with PHC. As per the norms of Government of India the sub center and PHC is having a maximum distance of about 21 Kms.

Following are the options available for connecting PHC and Sub center [6, 7].

○ **Through Smart Phones and Its Applications**

More advanced mobile phone technologies are enabling the potential for further healthcare delivery. Smartphone technologies are now in the hands of a large number of physicians and other healthcare workers in low- and middle-income countries. Although far from ubiquitous, the spread of Smartphone technologies opens up doors for mHealth projects such as technology-based diagnosis support, remote diagnostics and telemedicine, web browsing, GPS navigation, access to web-based patient information, post-visit patient surveillance, and decentralized health management information systems (HMIS)[8].

While uptake of Smartphone technology by the medical field has grown in low- and middle-income countries, it is worth noting that the capabilities of mobile phones in low- and middle-income countries has not reached the sophistication of those in high-income countries. The infrastructure that enables web browsing, GPS [9] navigation, and email through Smartphones is not as well developed in much of the low- and middle-income countries. Increased availability and efficiency in both voice and data-transfer systems in addition to rapid deployment of wireless infrastructure will likely accelerate the deployment of mobile-enabled health systems and services throughout the world.

Following types of applications can be implemented through Smart Phones:

- The Hand held computer devices can enhance data collection and compilation.
- The work plans for the health workers can be generated and provided on the handheld devices.
- The hand held computer can update the database at the Primary health center PC periodically.
- Education and awareness.
- Helpline.
- Diagnostic and treatment support.
- Communication and training for healthcare workers.
- Disease and epidemic outbreak tracking.
- Remote monitoring.
- Remote data collection.

○ **Through GPS service**

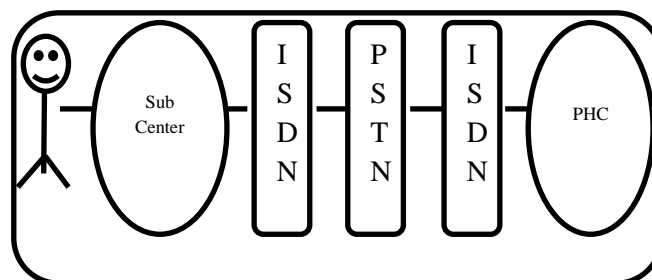
- Establishment of Patient Diagnostic Units linked through higher centers can be done through GPS system at PHC level health centers [10, 11].
- Mobile health clinics can be established as per the requirements.
- Monitoring of Health care facilities is also implemented through GPS enabled devices.



(<http://www.google.co.in/>)

○ **Through ISDN Network between PHC and Sub Center**

Integrated Services Digital Network (ISDN) [12, 13] is a set of communication standards for simultaneous digital transmission of voice, video, data, and other network services over the traditional circuits of the public switched telephone network [14]. As most of the areas in Uttarakhand is connected by Telephone lines so it is easy to develop an ISDN network between sub center and PHC.



The key feature of using ISDN network between sub center and PHC is the availability of telephone networks [15] as ISDN integrates speech and data on the existing telephone lines. There are several types of ISDN networks as [16]:

- Basic Rate Interface (BRI)
Use for transferring the data upto 128 KB.
- Primary Rate Interface (PRI)
Use for Transferring Data upto 2048 KB.
- Narrow band ISDN (N-ISDN)
- and Broad Band ISDN

IV. Conclusion

The objective of the present paper is to introduce the methods for connecting Sub center and PHC by using ICT based applications. Using of various technologies like ISDN, SMART phones [17] for connecting depends upon the applications and facilities we need to implement. In further research we can enhance the existing research by discussing the issues related with specific technology and applications in implementing eHealth.

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