

District Health Information System (DHIS2) Software in India

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Abstract—The District Health Information System (DHIS2) Software is the integrated healthcare information system, which provide users the option of data entry at village level or at ANM level and analysis of accurate health data at central, state and district level. DHIS records information on health events, improves service delivery efficiency and check the quality of healthcare services. India has adopted DHIS2 for the collection, analysis, presentation and validation of aggregate statistical health data. Health data incorporates all the data needed by policy makers, clinicians and health service users to improve and protect population health. It provides timely and accurate information leading to better health care planning and improved diagnosis. This paper provides relevant aspects of DHIS software like technology used scope and focused efforts about its implementation in Indian public healthcare organizations. This paper also examines the DHIS implementation in other developing countries of the world. An attempt is made in this paper to understand the implementation of District Health Information System (DHIS2) Software in Indian public healthcare organizations.

1. INTRODUCTION

In India, health data was collected and compiled manually by the clerical staff of the health department. No technical inputs on the quality of the data were provided. Computerize of the whole data was a big challenge for the Government. A key aim was to shift the whole manual process into computerized way for providing aggregate statistical health data needed by policy makers, clinicians and health service users to improve and protect population health. Therefore, the focus was how this can be applied in various priority areas of planning and monitoring at various levels of the health administration - from block level planners to district administrators, and state level program managers and central policy makers. India has adopted District Health Information System (DHIS2) Software from central level to ANM level of a village for data entry of health data.

2. DISTRICT HEALTH INFORMATION SOFTWARE (DHIS2)

For the purpose of health data collection District Health Information System (DHIS2) software has adopted by India.

The DHIS 2 is collaboratively developed by Health Information System Program(HISP), India through networks of globally distributed developers based in Norway, India, Vietnam, Ethiopia, Tanzania, Ireland, and Togo. DHIS2 is open source software to support the routine health information systems in the states. The District Health Information System (DHIS) is an integrated physically distributed information system of health facilities, which provides users the option of data entry at village level or at ANM level and analysis of accurate health data at central, state and district level.

2.1 The key functionalities offered by DHIS2

1. Data layer—platform and database independent, can inter-operate and collate disparate types of aggregate data (services, human resources, infrastructure, aggregate patient data and others), fully equipped to handle data validation, import survey data and many others.
2. Application layer—through its ability to easily define new datasets, indicators, and create reports, new applications can easily be created and deployed—for example, integration of with HMIS applications for School Health, IDSP and many others.
3. Presentation layer—strong reporting functionalities for pre-defined and ad-hoc reports, executive dashboard for bird's eye view of key indicators, data visualize and analyser for health status and data quality analysis. Integrated with GIS for map based representations.
4. Deployed—“in the cloud or in the basement”—online and offline, accessible through mobile, and other means.
5. Multi-language enabled, currently available in more than a dozen national and international languages.
6. Integrated with various other party applications like for m-health, Name Based Tracking, Open Health GIS, and outputs exportable to enable processing in EpiInfo, Excel, SPSS and various others.
7. Web API allows integration with other databases and supports the development of an “Integrated Information Portal.

3. IMPLEMENTATION OF DHIS2 IN INDIA

DHIS2 has been adopted by more than 20 states in India. This is undoubtedly one of the largest implementation of open source software for health information systems in the developing country. DHIS2 has been certified for security by the Ministry of IT, Government of India, and has also been tested for functionality, performance and usability. India has provided DHIS tool at the village level. The data regarding all the activities are collected by the ANM through door to door visit. Accurate and timely information, in a web based platform is required both by the Government of India and the State. DHIS2 links health facilities in the State including all SCs, PHCs, CHCs, District Hospitals, Government Hospitals, General Hospitals, W & C Hospitals, Medical Colleges, Taluka Hospitals and Specialty hospitals to collect and process data from all institutions up to peripheral Sub Centres and even Private health facilities. Health staff belonging to Health department was given initial training under the program to switch over to online reporting. Now most of the States has started generating data in the new system. Now in India patient data from every village/ block/town/district/state is collected through District Health Information System (DHIS2) Software. DHIS2 has implemented in India in two phases. The Phase I of the DHIS2 focused on establishing systems required for routine information processing, (including data entry, processing, reporting and transmission). During this phase efforts was for placing designated staff at the state and district levels capable of operating the applications for all the routine information processing activities including data entry, data validation, generation of routine and analysis reports, and the transmission of data and reports across different administrative levels. In Phase II wherein main focus is on the use of information for action, including strengthening and institutionalizing processes for the use of information for action. DHIS2 also provide the facility of DHIS Mobile module, which is developed within the DHIS2. Through this facility the registering and transmitting of data to the DHIS2 server, either through SMS or GPRS network can be performed. Department of Health & Family Welfare, Punjab decided to introduce mobile based reporting for all 5000 health workers across the state and for this purpose the state bought phones and SIM cards for each worker. HISP India designed and developed the sub centre reporting application with month and daily reports and installed the application on phones and built capacity of all 5000 health workers on application use. This is one of the largest m-Health implementation globally.

3.1 Data Flow in DHIS2 in India

At the village level ANMs collect the data by visiting door to door. All births and deaths under the jurisdiction of sub- centre should be documented and sex ratio at birth should be monitored and reported. Supportive supervision and record checking at periodic intervals by the Male and Female Health supervisors from PHC (at least once a week) and by MO of

the PHC (at least once in a month) etc. is performed. Then the data is transferred to PHC for compilation, after the integration of data received from all subcentres working under this PHC, data is transferred to CHC. In the same manner the data is transferred up to district level, where it is processed by District Statistical Officer and transfers it to the state level deputy or joint director. From the state level the processed data is transferred to Central department. After compilation the data is send to Central Bureau of Health Intelligence Statistics Division and Department of Health & Family welfare, Government of India. The following table depicts the data flow from Sub-Center to Directorate General of Health Services

Table 1: Flow of Data in Public Health Organizations

Healthcare Organization Name	Healthcare Worker	Data flow	Frequency of Reports
Sub-centre	one Female (ANM) and one Male Health Worker	Sub-centre to PHC	Monthly/fortnightly
Primary Health Centre	Medical Officer and 14 other staff	PHC to CHC	Monthly
Community Health Centre	four Medical specialists Surgeon, Physician, Gynecologist and Pediatrician supported by 21 paramedical and other staff	CHC to Sub-divisional/District Hospital	Monthly
Sub-divisional Hospitals/District Hospitals	CMO/SMO, Team of doctors	District to State Headquarters/Tertiary hospital of state	Monthly
Multi-speciality/Tertiary Hospital	Dy/Joint director Statistics-Family welfare –Dy/Joint director-statistics Surveillance Unit Sample Registration system	State Centre to	Monthly
Central Government	CBHI, Deptt. Of H&FW, Deptt of HS reg. System	Center to Govt	Monthly compiled annual analysis

3.2 Total Number of Sub-Centres, PHC and CHC Functioning in India

Table 2: Number Of Sub-Centres, PHCs&CHCs

S. No.	State/UT	Sub Centre	PHC's	CHCs
1	Andhra Pradesh	12522	1624	281
2	Arunachal Pradesh	286	97	48

3	Assam	4604	975	109
4	Bihar	9696	1863	70
5	Chhattisgarh	5111	755	149
6	Goa	205	19	5
7	Gujarat	7274	1158	318
8	Haryana	2520	447	109
9	Himachal Pradesh	2065	472	76
10	Jammu & Kashmir	1907	396	84
11	Jharkhand	3958	330	188
12	Karnataka	8871	2310	180
13	Kerala	4575	809	217
14	Madhya Pradesh	8869	1156	333
15	Maharashtra	10580	1811	363
16	Manipur	420	80	16
17	Meghalaya	397	109	29
18	Mizoram	370	57	9
19	Nagaland	396	126	21
20	Odisha	6688	1226	377
21	Punjab	2951	449	132
22	Rajasthan	11487	1528	382
23	Sikkim	147	24	2
24	Tamil Nadu	8706	1227	385
25	Tripura	719	79	12
26	Uttarakhand	1848	257	59
27	Uttar Pradesh	20521	3692	515
28	West Bengal	10356	909	348
29	Andaman & Nicobar Islands	119	22	4
30	Chandigarh	16	0	2
31	Dadra & Nagar Haveli	50	6	1
32	Daman & Diu	26	3	2
33	Delhi	41	5	0
34	Lakshadweep	14	4	3
35	Pondicherry	51	24	4
	All India	148366	24049	4833

The sources of above data is Rural Health Statistical in India 2012 evaluated by statistics Division, Ministry of Health & family welfare, Government of India

4. DHIS2 IN DEVELOPING COUNTRIES

DHIS2 is the preferred health management information software in 46 countries and even more organizations across four continents. DHIS2 help governments in developing countries and health organizations to manage their operations more effectively, monitor processes and improve communication. DHIS 2 currently being used at various levels in 46 countries out of which 16 countries has adopted the DHIS2 as per complete nation implementation and 12 countries has Adoption as programs or partial national roll-out and 18 countries as Pilot stage or early phase in roll-out. DHIS 2 is currently available in English, French, Spanish, Portuguese, Hindi, Vietnamese, Chinese and Norwegian. The following table depicts the implementation of DHIS2 in developing countries.

Table 3: DHIS2 implementation in Developing Countries

DHIS2 Implementation Globally	List of Countries
Completed Nation Implementation	Bangladesh, Burkina Faso, Ghana, India, Kenya, Liberia, Mozambique, Nigeria, Rwanda, Sierra Leone, Tanzania, The Gambia, Uganda, Zambia, Zanzibar, Zimbabwe
Partial National Roll-out	Algeris, Bhutan, Burundi, Colombia, DRC, Laos, Malawi, Solomon Islands, South Africa, Sri Lanka, Tajikistan, Vietnam
Pilot stage or Early phase in roll-out	Afghanistan, Benin, Congo Brazzaville, Cote d'Ivoire, Guinea Bissau, Mexico, Myanmar, Namibia, Nepal, Nigar, North Korea, Samoa, Senegal, South Sudan, Sudan, Timor Leste, Togo, Vanuatu

5. DHIS2 TECHNOLOGY & SUPPORT

DHIS2 is a web application based on standard Java technology. DHIS2 is released as free and open software under the BSD license. This means that it is not only available for download free of charge, but you have access to the source code and may modify and redistribute the software in any way you like. This means DHIS2 can be deployed on a national online server as well as in an intranet offline setting. HISP provides training and support for users of the open source *District Health Information System (DHIS)* software, which is under continuous evolution responding to the maturing information needs of users.

6. CONCLUSION

In summary, maintaining a good health information System is essential for an effective healthcare system in any country. The present study gives an insight about implementation status of DHIS2 health care information system in India. For effective utilization of current and augmented health care information system trained manpower is required, so special attention should be given to this aspect of health care information system. The major advantage of computerization has been in saving of time of health workers in record keeping and report generation. Computerization has enabled implementation of a good system for service delivery, planning, monitoring and supervision.

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