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WER

WEBIIS: Digitizing routine immunization information for tomorrow

Background

Sri Lanka has a strong immunization programme, evolved over several decades. Management of the present immunization programme is supported by Management Information System (MIS), entirely driven manually. Manual MIS are known to produce data quality issues in accuracy, completeness and timeliness aspects in data entry and data transcription processes. It is true for current manual immunization management information system as well.

In addition, the current immunization MIS only covers the government sector institutions and few affiliated private sector institutions, involved in the immunization process. Therefore, data pertaining to immunizations done at other private sector institutions are not captured by the current manual information system. According to the immunization coverage survey conducted by the Epidemiology Unit in year 2010 in the Western province (where majority of private sector institutions are based and 30% of the total Sri Lankan population is concentrated), the private sector contribution for immunization amounted approximately to 13%.

It is mandatory to register each and every child born in Sri Lanka in the Birth and Immunization Register (BIR) according to the Public Health Midwife (PHM) area of permanent residency of the parents. Upon registration, PHM of the area updates BIR at each and every immunization encounter by child at the government sector or private sector as per National immunization schedule. This immunization tracking process is essential to keep track on immunization coverage and to achieve vaccine preventable disease eradication and elimination objectives of the National Immunization Programme which would enable the nation to achieve the Millennium Development Goals. However, it is increasingly becoming difficult due to increasing proportion of parents seeking private sector immunization services and non-availability of parents at homes during health workers' working hours. Some households are inaccessible to health workers due to social barriers.

It is also a known issue that when reaching the field level vaccine stock balance data in an emergency situation, it takes from days to weeks to get down the consolidated reports on the "current" stock positions of the vaccines. This is also a growing concern to immunization programme managers in the Ministry of Health.

Present system demands update of four registers in a given immunization encounter for each child. Namely, Child Health and Development Record part A and B, Clinic Immunization Register and Birth and Immunization Register. This update process consumes much of the service delivery time of the PHMM. This sometimes forces the PHM to skip the update of the registers leading to poor maintenance of registers.

Given the current global trends in communicable diseases and increasing international travel, presence of an immunization certificate is becoming mandatory at ports of entry in many countries. But at present, many Sri Lankan adults do not possess their childhood immunization details forcing them to undergo revaccination or costly antibody level testing for concerned diseases before their international travel. Current documentation policy also does not support protection of immunization tracking details for more than five years which definitely compromises the availability of immunization records of future adults. It also should be understood that one should travel to his original residential PHM area, if he wishes to access the BIR since it is kept and maintained locally.

With this background, in consistence with eGovernment and eHealth policies of the Government of Sri Lanka, the Epidemiology Unit of the Ministry of Health Sri Lanka has initiated a project called **Web Based Immunization Information System (WEBIIS)** to create a National Immunization Registry using World Wide Web technology to overcome the present obstacles faced by the immunization management information system and its users.

Objectives of the WEBIIS

- To register each child birth at the place of occurrence
- To track every vaccine encounter at the place of occurrence
- To provide prompt access to immunization history of an individual without geographic barriers
- To maintain real time stock balances of vaccines and related logistics used in the National Immunization Programme
- To make available real time data and information to managers of the immunization programme and researchers

WEBIIS at a glance

WEBIIS is a web browser based computer application for health staff and a web portal for general public. The web application and the web portal was developed using open source technologies and standards. WEBIIS application basically comprises of central server and field level clients connected via mobile or wired internet connection. Data transfer is done in real time. An offline mode has also been provided to accommodate the data capture in places where internet coverage has not yet reached. Audit trail and data backup plan is also incorporated for additional data security purposes.

Access to WEBIIS is controlled using a username and a password either at application or portal level. Health staff is allowed to access the data of their jurisdiction while parents are only allowed to access information regarding their own children.

Functionalities of WEBIIS have been organized into six modules as listed below.

- Birth registration module
- Vaccine and other logistic inventory module
- Human resource module
- Immunization tracking module
- Offline module
- Report module

Uses of WEBIIS in the National Immunization Programme

WEBIIS will pave the way to create a National Immunization Registry by registering all births occurring in Sri Lanka and tracking all the immunization encounters of the registrants in time to come. This information can be accessed by any authorized health worker for health care delivery purposes. In addition, WEBIIS will facilitate to capture detailed history of Adverse Events Following Immunization (AEFI). Captured data will provide useful information to minimize AEFI in future, making services provided by the National Immunization Programme safer.

Once the data is captured by the system it will generate a unique identification number called Health Identification Number. Using this number all the details entered previously for a given child can be retrieved later. This will save significant service delivery time of health workers and enable them to cater to more clients. In addition it will increase the data quality as the error can be trapped at data entry level and later. Captured error can be rectified and record can be updated ensuring same error free data available for entire database users.

This captured children's data can be shared with other health and non health service delivery departments to initiate their own computer based systems reducing re-entry of the baseline data. Theoretically, this initially captured data of children can be used to deliver various services throughout the entire life cycle. Once a person is dead, data can be archived and kept for future references.

Real time inventory of vaccines has been attached to the immuniza-

tion tacking component of the WEBIIS. This will facilitate the National Immunization Programme Managers to have a real time update of stock positions of the vaccines in their areas of purview. Apart from this, reports can be generated on child births and immunization tracking for various levels of health service delivery areas.

Presently, data and information are one of the main avenues of income generation. Many of the Government organizations have identified this potency of their own databases. Epidemiology Unit also has identified this potency of immunization data and exploring the possibility of revenue generation. In addition, WEBIIS has the potency to perform in other countries once it is customized for their needs. The customized version can be sold as a software product. Both these activities will ease the burden of tax payers of the country with regard to the capital and recurrent expenditure of the WEBIIS maintenance.

With all these facilities, current manual system namely the Quarterly Expanded Programme on Immunization Return can also be operated through the WEBIIS. Epidemiology Unit foresees that the electronic version of EPI return will eliminate much of data entry errors and data transcription errors. In addition, it will facilitate to drill down the data quality search up to the field immunization clinic level.

Development process

Requirement gathering for an electronic immunization MIS was done with the involvement of stakeholders of all layers of the National Immunization Programme. This requirement gathering was managed and assessed by a professional software developer. Based on the requirements gathered, a blue print of the new MIS was created and agreed upon by the software developer and the Epidemiology Unit. The new system was built on this foundation.

Achievements

Now the Web Based Immunization Information System is running live on the web. It is being pilot tested at the Medical Officer of Health (MOH) area Wattala in the Gampaha District. Currently information of all children who were born since year 2008 in Wattala MOH area has been entered into the WEBIIS database. Using these data, in eight field clinics of Wattala MOH area immunization status of children are being tracked daily. In addition, new birth registrations of children are being done as and when required.

WEBIIS also is implemented in eleven labour rooms in De Soysa Maternity Hospital, Castle Street Hospital for Women and Hemas Hospital (Pvt). Presently all the births pertaining to Western Province are being captured into the system. BCG immunization tracking will also be implemented within these hospitals in the next couple of weeks.

Same system has been demonstrated in the World Health Organization regional office, India, followed by a demonstration at WHO Headquarters at Geneva, Switzerland. In addition, WEBIIS has been demonstrated in several other international and national academic forums. The enthusiasm shown by the participants in these forums is very encouraging.

Partners of the WEBIIS

WEBIIS can be exemplified for an excellent Government-Private sector partnership. Epidemiology Unit of the Ministry of Health, EWIS, UNICEF, ICTA, Sri Lanka Computer Emergency Response Team, Mobitel (Pvt) Ltd and LankaCom (Pvt) Ltd are partners in this project.

Compiled by Dr. Chathura Edirisuriya of the Epidemiology Unit

Table 4: Selected notifiable diseases reported by Medical Officers of Health   31st August - 06th September (36th Week)

RDHS	Dengue Fever		Dysentery		Encephaliti		E Fever		F Poisoning		Leptospiros		T Fever		V Hepatitis		H Rabies		Chickenpox		Meningitis		Leishmaniasis		WRCD %	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	109	7156	4	157	1	16	2	107	0	45	6	155	1	7	2	64	0	1	12	317	5	49	0	0	77	23
Gampaha	55	2690	1	156	0	13	3	42	0	26	3	270	0	14	1	149	0	0	0	119	0	75	0	5	100	0
Kalutara	41	1318	6	139	0	17	1	65	0	23	5	287	1	3	0	17	0	0	2	200	2	55	0	0	69	31
Kandy	30	1406	2	111	1	11	3	20	1	8	3	60	2	88	3	73	0	0	2	99	1	12	0	3	91	9
Matale	6	363	1	77	0	4	1	23	2	7	4	53	0	4	2	35	0	0	0	39	1	30	1	9	85	15
NuwaraEliya	0	194	0	125	0	2	0	9	0	4	0	21	0	56	0	19	0	0	11	98	1	12	0	0	69	31
Galle	13	662	1	87	0	18	0	3	0	79	3	163	0	42	0	10	0	1	11	252	0	42	0	0	79	21
Hambantota	5	256	3	43	0	3	1	13	0	32	0	153	3	59	0	77	0	0	1	84	0	43	3	241	92	8
Matara	7	376	1	65	0	10	2	24	0	27	2	124	3	69	1	130	0	2	7	212	1	62	1	69	100	0
Jaffna	10	554	16	210	0	7	2	287	2	88	1	8	0	326	0	14	0	1	0	123	1	50	0	0	100	0
Kilinochchi	2	52	3	22	0	0	1	11	0	5	0	9	0	16	0	0	0	1	0	2	0	7	0	9	100	0
Mannar	1	60	5	52	0	1	0	57	0	25	0	13	0	18	0	2	0	0	0	11	0	5	2	3	80	20
Vavuniya	0	59	0	36	0	12	0	9	0	16	0	49	0	2	0	3	0	0	0	21	2	30	0	7	75	25
Mullaitivu	0	100	0	12	0	2	0	7	0	34	0	36	0	6	0	1	0	2	0	8	0	4	0	12	40	60
Batticaloa	7	478	9	226	0	5	1	4	23	38	1	31	0	2	0	10	0	3	1	38	0	7	0	0	79	21
Ampara	0	132	1	97	0	0	0	4	0	7	1	30	0	1	1	5	0	0	0	67	1	15	0	2	86	14
Trincomalee	1	178	0	51	0	3	0	5	0	1	1	59	1	11	0	3	0	1	1	34	0	4	0	27	83	17
Kurunegala	36	2380	2	133	0	32	0	35	0	21	7	250	1	32	0	42	0	1	3	285	0	92	0	36	89	11
Puttalam	12	756	0	55	0	7	0	15	0	35	3	35	0	12	0	5	0	0	0	65	3	31	0	7	46	54
Anuradhapura	10	422	4	76	1	14	0	3	1	31	1	294	1	19	0	18	0	1	6	146	0	82	12	319	79	21
Polonnaruwa	19	342	1	54	0	1	0	14	0	61	3	146	0	3	2	26	0	1	3	113	0	16	4	130	86	14
Badulla	7	402	1	142	0	4	0	14	0	8	2	47	0	65	1	40	0	0	3	100	0	52	1	6	59	41
Monaragala	3	191	2	92	0	4	0	19	0	20	1	189	2	51	3	74	0	1	0	39	2	22	0	10	73	27
Ratnapura	17	1481	6	290	0	83	1	36	0	16	4	278	2	49	47	305	0	1	1	127	2	67	0	12	78	22
Kegalle	15	895	2	99	0	13	1	23	0	11	6	153	2	65	3	177	0	0	9	252	2	95	0	0	82	18
Kalmune	0	485	3	126	0	2	0	3	0	98	0	8	0	2	0	4	0	0	3	74	0	8	0	1	92	8
SRI LANKA	406	23388	74	2733	03	284	19	852	29	766	57	2921	19	1022	66	1303	00	19	76	2925	24	967	24	908	81	19

Source: Weekly Returns of Communicable Diseases (WRCD).

*T=Timeliness refers to returns received on or before 06th September, 2013 Total number of reporting units 339. Number of reporting units data provided for the current week:274 C** Completeness

A = Cases reported during the current week. B = Cumulative cases for the year.**H Rabies***= Human Rabies, **E Fever***=Enteric Fever, **F Poison*** =Food Poisoning, **T Fever***=Typhus Fever, **V Hepatitis***=Viral Hepatitis

Table 1: Vaccine-Preventable Diseases & AFP   31st August – 06th September (36th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2013	Number of cases during same week in 2012	Total number of cases to date in 2013	Total number of cases to date in 2012	Difference between the number of cases to date in 2013 & 2012
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	01	01	03	00	00	00	00	01	00	06	01	66	55	+ 20.0 %
Diphtheria	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Mumps	03	03	05	02	03	03	02	03	01	25	76	1158	3466	- 66.6 %
Measles	18	03	18	02	04	06	03	01	46	104	01	2605	42	+ 6102.4 %
Rubella	00	00	00	00	00	01	00	00	00	01	-	23	-	-
CRS**	00	00	00	00	00	00	00	00	00	00	-	06	-	-
Tetanus	00	00	00	00	00	00	00	00	00	00	00	16	08	+ 100.0 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	-	00	-	-
Japanese Encephalitis	00	00	00	00	00	00	00	00	00	00	-	66	-	-
Whooping Cough	00	00	01	01	00	00	00	00	00	02	00	64	69	- 07.2 %
Tuberculosis	48	00	14	03	11	00	00	04	23	103	22	5895	6107	- 03.5 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: **AFP* (**Acute Flaccid Paralysis), Japanese Encephalitis

CRS** =Congenital Rubella Syndrome

AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH

Dengue Prevention and Control Health Messages

To prevent dengue, remove mosquito breeding places in and around your home, workplace or school once a week.

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

ON STATE SERVICE

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