WEEKLY EPIDEMIOLOGICAL REPORT

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Infectious Disease Surveillance Part II

This is the last article of the series of two articles named as Infectious Disease Surveillance.

Syndromic (Clinical) versus Laboratory-confirmed Surveillance case definitions

Surveillance networks identify and enroll cases that meet specific case definitions. Case definitions have 3 essential components: person, place and time. Case definitions vary in sensitivity and specificity. *Sensitive case definitions* are more inclusive and less likely to miss cases, but will include a higher proportion of patients that do not have the disease as well e.g. current SL case definition for suspected measles/rubella. However, *specific case definitions* have stricter criteria and will exclude more patients that do not have the disease but can also miss patients with milder / atypical disease presentations. In general, case definitions should be as sensitive and specific as possible.

Syndromic surveillance

Involves monitoring cases that meet a clinical case definition for the disease under surveillance, typically without laboratory confirmation. This allows for rapid identification of a cluster of cases that might warrant further investigation. E.g. acute fever/rash surveillance used to monitor measles and rubella. As field investigations are ongoing, laboratory testing can be carried out to determine the etiology. Syndromic surveillance system case definitions can be used in emergency / outbreak situations as an alert system to identify suspect cases that meet a broad case definition to then be further investigated. In contrast, some surveillance case definitions are based on confirmed cases in a laboratory where the etiologic agent can be identified through a variety of lab tests (e.g. serology, bacterial culture etc). For example, virologic influenza surveillance networks use laboratory-confirmed influenza to determine the circulating strains to provide information for vaccine composition. A critical objective of ***laboratory-based surveillance*** is to monitor for emerging drug resistance in pathogens or shifts in serotype distribution.

Zoonotic Surveillance

Zoonotic diseases cause disease in humans and can be challenging to control since both animals and humans can be the hosts. Currently, many zoonotic diseases of public health importance exist (e.g. Avian influenza, Ebola, Lyme disease, COVID-19, SARS, Nipah virus, rabies etc). While traditionally, zoonotic and human disease surveillance has existed separately, there has been a push to harmonize these systems to improve surveillance for diseases affecting both populations. An example is the surveillance for *Borrelia burgorferi*, the causative agent for Lyme disease, in the tick population can help public health staff to determine proper interventions to decrease the transmission from ticks to humans. The One Health approach emphasizes the link of human health to the surrounding environment and animals.

Serosurveillance

Serosurveillance involves the use of blood specimens to determine the burden of disease or immunity gaps in a population. Usually done as a periodic survey for multiple diseases of interest simultaneously. However, this surveillance cannot provide timely information; thus an outbreak might be discovered by this method, but could be potentially too late for an intervention to reduce disease transmission. *An example of this type of surveillance is the Hepatitis B Serosurveillance which was carried out among pregnant women and children <5 years conducted by the Epidemiology Unit in SL in 2022.* As hepatitis B is frequently asymptomatic in children, evaluating the impact of vaccination is extremely challenging. Thus, this type of serosurveillance among cohorts of vaccinated children help to identify the burden of disease and determine impact of vaccination efforts.

Adverse Events Following Immunization (AEFI) Surveillance

Contents

AEFI surveillance is a critical component of ensuring vaccine safety in the populations where vaccines are being used. It often begins at the health facility level, where Health Care Workers (HCW) are trained to identify AEFI and reported to higher levels. This surveillance is essential for investigating problems that could potentially occur with mishandling of vaccines in the cold chain (improper storage) and during administration of vaccines, which can directly impact the public perception of the vaccine program.

Innovative Technology Strategies for Surveillance

Technology has increased the availability of data on health that can be used for infectious disease surveillance. New data sources include mobile data, electronic health records and social media. These aggregate sources and speed at which they can be compiled are referred to as 'big data'. They can provide more real-time information to help mitigate outbreaks or improve health of the population. However, suitable technology needs to be in place along with appropriate methods of analyzing the accuracy of data for such type of surveillance to be considered as precise. Use of mobile technology to improve systems is also an area of public health importance (m-health). Mobile data can monitor movement of people during an outbreak and this info can be used to predict how a specific disease will spread. However, the ethics behind this level of access to people movements also need to be taken into account.

Global and Regional Surveillance Partnerships for Disease Control

The ***Integrated Disease Surveillance and Response (IDSR)*** strategy was primarily drafted for the African Region in 1998 with the aim of integrating surveillance carried out at community, health facility, district and national level to improve data collection and conserve resources. This can help reduce the work burden at all levels of health staff, is more efficient and costs less than nonintegrated surveillance. However, the challenge is the necessity of often more information than is readily available to target intervention activities.

The ***Global Outbreak and Response Network (GOARN)*** is a WHO-coordinated network comprised of over 600 partners worldwide involved in epidemic surveillance. Purpose is to coordinate a rapid response to international disease emergencies through deployment of resources to the affected countries.

Increase in international travel is an important risk factor in the spread of infectious diseases as is the case in many infectious diseases from common travelers' diarrhea to the COVID pandemic. A serious threat to public health can occur especially when novel pathogens are introduced into a naïve (not vaccinated or without protective antibodies) community. ***GeoSentinel*** is a global network of clinics assessing travelers' and migrants' health for illnesses acquired while abroad. This network of clinics confirms and registers cases of infectious diseases acquired while travelling and such surveillance info is useful for tracking movement of diseases and informing guidelines for travel medicine.

Disseminating Infectious Disease Surveillance information

Surveillance is an action oriented public health tool. Time lags can thus affect outcomes if there isn't a rapid response with interventions.

Periodic Dissemination Tools: Surveillance bulletins and reports are a frequently used method for disseminating surveillance information. These can be used to send info to stakeholders and partners involved with the surveillance. Scientific literature and conferences are also important avenues for dissemination of surveillance data. However, there can be a long time-lag between data generation and publication in this scenario. While this is critical for improving wealth of available knowledge, it is not timely enough to mobilize an outbreak response. The Morbidity and Mortality Weekly Report (MMWR) from CDC and the Weekly Epidemiological Record (WER) from WHO are two examples of periodic, non-peer-reviewed dissemination tools.

Ongoing, real-time dissemination tools: With advance of social media and the internet, innovative strategies for quicker dissemination of surveillance information for rapid public health interventions become available. Several examples exist such as the *Program for Monitoring Emerging Diseases (ProMED)* run by the International Society for Infectious Diseases, the online platform – *HealthMap* run by the Boston Children's hospital and the *Health Alert Network* at the CDC. Event based surveillance entails monitoring cases and disease outbreaks through formal and informal news and online reporting platforms. Traditional surveillance can miss many outbreaks or delay the opportunity for intervention. However, the data and reporting methods are much less structured than the traditional surveillance, but allows for quick detection of events that require investigation.

Surveillance as a Platform for Research and Special studies

Using an existing surveillance network as a platform for surveillance of additional diseases allows streamlining resources and can be a cost-effective measure to improve public health.

Vaccine Studies*:* Surveillance sites can be used as platforms for research and special studies. Since surveillance for VPDs are often conducted in infectious disease surveillance sites, studies on vaccine effectiveness and vaccine impact can be built on the platform of surveillance. Vaccine impact studies can use surveillance to demonstrate reduction of disease after introducing an intervention such as a vaccine. Vaccine effectiveness studies evaluate the ability of a vaccine to control the disease in a real-world setting, which differs from vaccine efficacy studies where the vaccine impact is estimated in a controlled clinical situation.

Burden of Disease Models: Estimating the burden of disease at the country or global level with epidemiological models can be a critical part of using surveillance data and advocacy for disease interventions. In situations where surveillance data is inadequate, or lab confirmation is not available, or relevant data has not been collected; models using local and nonlocal data can be considered.

Source:

Cohen, A.L., Murray, J. (2017). Infectious Disease Surveillance. *International Encyclopedia of Public Health*, 2nd Ed, Vol 4, 222-229. http://dx.doi.org/10.1016/B978-0-12-803678-5.00517-8

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Table 1: Selected notifiable diseases reported by Medical Officers of Health 24th– 30th June 2023 (26th Week)

RDHS	Dengue Fever		Dysentery		Encephaliti		Enteric Fever		Food Poi-		Leptospirosis		Typhus		Viral		Human		Chickenpox		Meningitis		Leishmania-		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	342	9027	0	7	1	10	0	1	0	7	7	176	0	0	0	3	0	0	4	164	0	25	0	5	**26**	**100**
Gampaha	302	9344	0	8	0	13	0	1	0	2	2	314	0	6	0	9	0	0	0	145	1	41	2	29	**2**	**99**
Kalutara	129	3085	0	14	0	1	0	0	0	5	12	485	0	1	0	4	0	1	4	255	1	52	0	1	**16**	**100**
Kandy	242	3391	1	24	0	0	0	7	0	12	7	151	1	37	1	3	0	1	4	150	2	16	2	18	**85**	**100**
Matale	38	850	0	2	0	0	0	1	0	8	6	107	0	10	0	3	0	0	0	31	0	4	1	176	**21**	**100**
NuwaraEliya	8	136	4	80	1	2	0	2	0	38	3	63	3	43	0	4	0	0	5	69	0	8	1	1	**59**	**100**
Galle	94	1416	2	30	1	12	0	5	0	19	16	540	1	28	0	1	0	1	8	197	0	12	1	2	**35**	**100**
Hambantota	46	988	0	6	0	3	0	1	0	8	2	199	0	50	0	7	0	0	0	92	1	16	9	347	**25**	**100**
Matara	40	1052	0	19	0	6	0	1	0	11	9	354	1	20	0	2	0	2	8	160	2	14	3	105	**52**	**100**
Jaffna	24	1634	1	51	0	1	0	9	0	16	0	8	0	473	1	2	0	1	3	114	0	6	0	2	**63**	**93**
Kilinochchi	4	73	1	5	0	0	0	0	0	16	0	7	0	6	0	0	0	0	0	12	0	0	0	0	**18**	**99**
Mannar	2	73	0	6	0	0	0	1	0	0	3	30	0	5	0	0	0	0	0	1	1	7	0	0	**34**	**100**
Vavuniya	1	115	0	5	0	1	0	0	0	0	0	25	0	7	0	1	0	0	0	14	0	3	0	7	**9**	**100**
Mullaitivu	4	91	1	9	0	0	0	3	0	11	0	29	0	5	1	1	0	0	1	12	0	0	0	5	**22**	**100**
Batticaloa	51	1855	1	135	0	6	0	5	0	17	3	63	0	1	0	5	0	1	4	45	0	24	0	1	**55**	**100**
Ampara	1	69	0	1	0	1	0	0	0	0	0	20	0	0	0	1	0	0	1	20	1	12	0	2	**12**	**51**
Trincomalee	34	1861	2	12	0	1	0	0	13	17	0	55	0	13	0	0	0	0	1	34	0	20	0	1	**23**	**100**
Kurunegala	103	2027	0	25	0	7	0	0	0	4	4	229	0	9	0	9	0	2	10	287	6	94	4	274	**23**	**100**
Puttalam	35	2601	1	8	0	1	0	1	1	1	2	34	0	7	0	1	0	0	0	74	0	33	0	15	**19**	**100**
Anuradhapur	32	538	1	5	0	0	0	1	0	2	5	212	3	28	0	2	0	0	2	144	1	30	8	306	**22**	**99**
Polonnaruwa	8	431	0	10	0	5	0	0	0	6	1	126	0	5	0	12	0	0	0	49	0	13	2	239	**34**	**98**
Badulla	26	668	3	22	0	3	0	0	0	27	15	196	1	29	1	61	0	0	5	104	1	27	3	20	**63**	**100**
Monaragala	17	376	1	15	0	5	0	0	0	0	7	394	1	29	0	17	0	0	2	48	4	45	1	102	**25**	**100**
Ratnapura	64	1379	1	28	0	13	0	2	0	13	28	693	2	18	0	12	0	1	1	105	5	108	6	106	**34**	**100**
Kegalle	76	1872	0	13	0	1	0	2	0	8	15	401	1	22	0	3	0	0	10	250	1	35	0	18	**29**	**100**
Kalmune	15	1518	2	44	1	10	0	0	0	0	0	34	1	1	0	0	0	0	1	44	2	22	0	0	**39**	**99**
SRILANKA	**1738**	**46470**	**22**	**584**	**4**	**102**	**0**	**43**	**14**	**248**	**14**	**4945**	**15**	**853**	**4**	**163**	**0**	**10**	**74**	**2620**	**29**	**667**	**43**	**1782**	**35**	**98**

Source: Weekly Returns of Communicable Diseases (esurvillance.epid.gov.lk). T=Timeliness refers to returns received on or before 30th June, 2023 Total number of reporting units 358 Number of reporting units data provided for the current week: 339 C**-Completeness

A = Cases reported during the current week. B = Cumulative cases for the year.

Table 2: Vaccine-Preventable Diseases & AFP

24th– 30th June 2023(26th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2023	Number of cases during same week in 2022	Total number of cases to date in 2023	Total number of cases to date in 2022	Difference between the number of cases to date in 2023 & 2022
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	00	01	00	00	02	02	00	48	43	11.6 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Mumps	01	00	00	00	00	00	02	00	01	05	01	112	35	220 %
Measles	06	01	00	03	00	00	01	00	00	11	01	40	13	207.6 %
Rubella	00	00	00	00	00	00	00	00	00	00	00	01	00	0 %
CRS**	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Tetanus	00	00	00	00	00	00	00	00	00	00	00	05	05	0 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Japanese Encephalitis	00	00	00	00	00	00	00	00	00	00	00	02	07	- 71.4 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	00	04	01	300 %
Tuberculosis	106	00	12	15	15	03	08	08	07	174	18	4624	3050	51.6 %

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

NA = Not Available

Take prophylaxis medications for leptospirosis during the paddy cultivation and harvesting seasons.

It is provided free by the MOH office / Public Health Inspectors.

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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