



WEEKLY EPIDEMIOLOGICAL REPORT

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Bioterrorism

According to the Center for Disease Control, USA bioterrorism is the deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people, animals, or plants. These agents are typically found in nature, but it is possible that they could be changed to increase their ability to cause disease, make them resistant to current medicines, or to increase their ability to be spread into the environment. Biological agents can be spread through the air, through water, or in food. Terrorists may use biological agents because they can be extremely difficult to detect and not cause illness for several hours to several days. Some bioterrorism agents, like the smallpox virus, can be spread from person to person and some, like anthrax, cannot.

History of bioterrorism goes back to the Roman civilization where they have used human faeces as a weapon. They used to throw faeces over the faces of enemy soldiers. This will cause food poisoning among exposed enemy soldiers and invariably cause outbreak situation in the enemy camp with poor sanitation conditions as well as poor sanitation habits. Within a few days there would be a lesser number of enemy forces to face with the Roman army giving a victorious advantage. There were evidence that biological means have also been used in World War I and II. In all these situations wide use of biological weapons were limited as the technology that was used to disseminate the biological agents was not well developed to secure the potency of the agents used. Other than that, infectivity and spread of biological agents were well developed to have the desired control.

Apart from the above example until the latter part of the 20th century bioterrorism was more or less confined to the dictionary definition and to theoretical possibility. The topic was discussed among professionals in the respective fields. This was due to the science of producing enough organisms to have infective dose and dispersing them in a weaponry form is so difficult that it is within the reach of only

the most sophisticated laboratories owned by the richest nations in the world. But with the advancement of the biotechnology, military technology and access to knowledge of biological weaponry paved the path to cross these barriers to produce biological weapons. In addition, the changes in political and economical power balance in the world arena also help to pass the knowledge of biological warfare to the terrorist groups.

The devastating results of bioterrorism have been well summarized by Richard Nixon, President of USA, who once said that, "biological weapons have massive, unpredictable, and potentially uncontrollable consequences. They may produce global epidemics and impair health of the future generations." With this vision he has ordered the relevant officials to close down the biological arms development in USA.

The most feared disadvantage of the biological weapon is the victimization of both parties to the same pathogen since there was no means of containing the spread of the pathogen. Therefore, scientists who were working in this field studied new ways and means of using biological weapons. Now they are concentrating on destroying animals and the plants which can directly affect food production and the economy of the country but less or no effect on humans using genetic engineering methods. Though there are no actual incidences of biological weapon use to destroy the economy of a country, the capability was well demonstrated by natural occurrence of such disease. The best example is the foot and mouth disease that destroyed the majority of cattle stocks in England in 2001 and 2007. Due to the main limitations of the biological weapons i.e. victimization of both groups, difficult to control and unpredictable spread, biological weapons are used for creating psychological threat in the enemy party or mass panic creator for disruption of smooth functioning of the society. This type of mass panic was caused in the USA by terrorist

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groups and in Japan by a extremist religious groups.

When considering the biological agents that can be used to produce terror, they are classified according to their potency to cause illness, complications, portability and ability for easy dissemination.

• **Category A:**

These pathogens are highly virulent and cause high mortality. Agents in this category can transmit and disseminated easily. Examples are Anthrax, Smallpox, and Viral haemorrhagic fever.

• **Category B:**

These pathogens are moderately easy to transport and disseminate. They have low virulence. Brucellosis, Salmonella spp., and E. coli are in this group.

• **Category C:**

They are the emerging pathogens with ease of production and dissemination and those can be genetically engineered to transform into high virulence as well as high portable form. E.g. Hanta virus, Nipah virus.

Since bioterrorism is dealing with the infectious agents, possible threat will be monitored using the same theories of communicable disease monitoring i.e. disease surveillance. Due to the fact that its potential threat of rapid destruction over a mass population some modification may be applied to fine tune the operational needs of the system like high sensitivity and ability to emit early warning.

Because of heightened concerns about the possibility of bioterrorist attacks, public health agencies are testing new methods of surveillance intended to detect the early manifestations of illness that may occur during a bioterrorism related epidemic. It is considered a bioterrorism surveillance system is much more cost effective when operate using syndromic definition rather than using a single disease entity. This “**syndromic surveillance**,” encompasses a spectrum of activities that include monitoring illness syndromes or events for early warning, detect affected community, detect contaminated area and initiate rapid response for treatment and control. The primary objective of the surveillance system is to detect the threat before specific diagnosis is made and reported to public health authorities. It is also essential to establish a diagnosis for specific public health response to a bioterrorism related epidemic, since the diagnosis will guide the use of proper vaccinations, medications, and other appropriate interventions.

Though the world fear about bioterrorist attacks or use of biological weapons under “legitimate authority”, up to now human beings are fortunate not to face massive destruction due to their

- use. Since future possibility of such an attack cannot be ruled out, many organization around the world working towards preparedness of bioterrorist attack have defined many levels of preparedness as follows

• **Personal level:**

can be divided into three steps. 1 – Arrange emergency kit which contain valuable personal documents, essential

medications for a few days, food and water for a few days and place all of them as a package in an easily accessible place. 2 – Preplan a safe place as a final destination in the emergency period. 3- Be informed on local and national guidelines that will be followed in a state of emergency.

• **Business level:**

main concern is the mitigation of spread of airborne pathogens. This task is achieved incorporating newer methods of air circulation, air circulation control and air filtration methods in the commercial building construction.

• **Healthcare institutional level:**

most probably healthcare facilities will be the first place to detect a possible bioterrorist attack. All treating physicians should be aware of the case definitions established for case detection purpose. Hospital should have a list of contacts of key personnel and institutes in a bioterrorist attack to quickly initiate the response mechanism. In addition isolation units with personal protective equipment and treatment should be readily available in adequate quantities. Staff should be well trained for this demanding situation.

• **Local and national level:**

at these levels major functions are the setting up of surveillance systems, appointing authorized personnel and institutions for rapid response, providing guidelines and training. It is also necessary to provide legal and budgetary allocations for smooth functioning of the response process.

• **Legal sector:**

should have constant communication with health and law enforcement institutes to develop legal protocols for control of communicable diseases as well as local, national and international quarantine purposes.

Proper operation of these levels helps to mitigate the effects of a bioterrorist attack.

When considering the Sri Lankan context, the country has recently ended an almost 30 year war fare with a terrorist group and is still in the recovering stage. Members of the defeated militant group are still trying to gain their lost power back, nationally as well as internationally. They still have links with other terrorist groups all over the world and some of them have access to biological weapons. They have the wealth to purchase the weaponry and technology for biological war fare. Therefore, the possibility of this threat should always be remembered by the relevant groups namely armed forces, legal authorities and health care sector specially the public health professionals. It is better to evaluate by the relevant authorities to establish a surveillance and rapid response system in Sri Lanka in a bioterrorist attack.

References

- <http://www.bt.cdc.gov/bioterrorism/>
- <http://en.wikipedia.org/wiki/Bioterrorism>

This article was compiled by Dr. Chathura S Edirisuriya, Registrar (Community Medicine)

Table 1: Selected notifiable diseases reported by Medical Officers of Health 15th - 21st Oct 2016 (43rd Week)

RDHS Division	Dengue Fever		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human 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	96	13786	5	152	0	11	0	53	1	60	5	255	0	7	0	40	0	0	0	6	389	0	51	0	0	94	100
Gampaha	38	5766	5	135	0	14	1	26	3	37	6	293	0	15	4	44	0	1	3	358	1	41	0	7	80	87	
Kalutara	20	2944	2	91	0	10	0	33	0	30	4	388	0	8	1	26	0	1	3	249	3	84	0	0	79	86	
Kandy	23	3583	0	141	1	17	0	21	0	35	1	112	2	88	0	46	0	0	2	209	2	40	0	9	57	96	
Matale	2	926	0	60	0	1	0	14	0	4	0	84	0	20	0	16	0	1	1	34	0	54	0	18	54	77	
NuwaraEliya	2	373	2	90	0	3	1	54	0	36	1	59	1	69	0	38	0	0	0	124	0	38	0	0	92	100	
Galle	30	2076	2	127	0	8	0	8	0	10	4	253	3	104	0	9	0	0	4	255	0	35	0	3	70	80	
Hambantota	7	687	1	71	0	1	0	5	0	61	1	95	2	61	1	95	0	0	3	209	0	15	21	309	75	83	
Mataru	21	1086	0	107	0	15	0	8	1	39	3	165	1	51	0	41	0	0	2	165	0	23	4	177	100	100	
Jaffna	20	1872	10	289	2	8	1	79	4	60	1	17	6	598	0	9	0	0	4	156	0	58	0	1	100	100	
Kilinochchi	0	74	0	38	0	1	0	36	1	10	0	13	0	24	0	1	0	0	0	10	0	10	0	0	75	100	
Mannar	1	136	0	41	0	4	0	23	0	9	0	10	0	42	0	0	0	0	0	7	1	4	0	0	100	100	
Vavuniya	2	228	0	13	0	4	1	92	0	33	0	14	1	11	0	6	0	0	0	27	0	10	0	6	100	100	
Mullativu	1	163	1	27	0	4	0	18	0	41	0	24	0	6	0	2	0	1	0	23	1	11	0	6	80	80	
Batticaloa	7	465	5	281	0	3	2	44	0	98	0	45	0	6	0	11	1	1	0	95	0	14	0	1	50	79	
Ampara	0	222	0	49	0	2	0	0	0	21	0	26	0	0	0	10	0	0	0	143	1	5	0	8	29	86	
Trincomalee	0	360	0	52	0	2	1	12	0	24	1	31	0	24	0	33	0	2	0	141	0	12	0	11	75	83	
Kurunegala	8	2150	3	273	0	11	0	4	0	19	1	141	0	41	1	29	0	3	8	326	0	55	0	95	66	90	
Puttalam	4	933	5	84	1	5	0	6	1	2	3	42	0	61	0	3	0	1	0	79	3	55	0	4	64	79	
Anuradhapura	2	624	1	93	0	3	2	9	0	33	0	256	0	25	0	15	0	1	6	221	3	43	1	214	37	79	
Polonnaruwa	4	404	1	39	0	4	0	12	0	14	0	87	0	4	1	4	0	0	2	129	0	18	1	113	57	86	
Badulla	17	864	0	110	0	13	1	12	0	27	0	119	0	103	1	113	0	0	2	213	3	180	0	3	71	94	
Monaragala	0	367	1	116	0	1	0	4	0	11	1	159	0	116	0	133	0	2	3	73	0	23	0	34	73	100	
Rathapura	20	2587	0	316	0	31	0	26	0	24	7	497	0	36	6	186	0	0	9	208	0	141	0	1	72	89	
Kegalle	13	1275	0	72	0	19	0	32	0	53	2	165	0	29	1	29	0	0	3	294	2	51	0	2	82	100	
Kalmune	2	462	1	89	0	3	0	5	0	52	0	20	0	0	1	5	0	4	0	89	0	24	0	0	38	85	
SRILANKA	340	44413	45	2956	4	198	10	636	11	843	41	3370	16	1549	17	944	1	18	61	4226	20	1095	27	1022	70	89	

Source: Weekly Returns of Communicable Diseases (WRCD).

*T=Timeliness refers to returns received on or before 21st October, 2016 Total number of reporting units 339 Number of reporting units data provided for the current week: 308 C**=Completeness

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

Table 2: Vaccine-Preventable Diseases & AFP

15th - 21st Oct 2016 (43rd Week)

Disease	No. of Cases by Province									Number of cases during current week in 2016	Number of cases during same week in 2015	Total number of cases to date in 2016	Total number of cases to date in 2015	Difference between the number of cases to date in 2016 & 2015
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	00	00	00	01	00	01	02	58	61	-5.1%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0%
Mumps	01	01	00	00	01	00	00	00	00	03	02	333	324	+3.6%
Measles	00	01	00	01	00	00	00	00	00	02	18	345	2382	-85.5%
Rubella	00	00	00	00	00	00	00	00	00	00	00	09	08	+12.5
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	08	14	-43.1%
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	0%
Japanese Encephalitis	00	00	00	00	00	00	01	00	00	01	00	16	10	+60%
Whooping Cough	00	01	00	00	00	00	01	00	00	02	01	60	88	-32.1%
Tuberculosis	87	11	19	11	07	11	11	13	50	220	253	7709	8220	-6.2%

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

Look for plants such as bamboo, bohemia, rampe and banana in your surroundings and maintain them

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ON STATE SERVICE

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