WEEKLY EPIDEMIOLOGICAL REPORT
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Vol. 37 No.09 27th February - 05th March 2010

WEER SRI LANKA - 2010

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

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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 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 providelegal 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 complied by Dr. Chathura S Edirisuriya, Registrar (Community Medicine)

Table 1: Vaccine-preventable Diseases & AFP

20th – 26th February - 2010(08th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2010	Number of cases during same week in 2009	Total number of cases to date in 2010	Total number of cases to date in 2009	Difference between the number of cases to date in 20010& 2009
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	01	00	01	00	00	00	00	00	02	02	18	10	+ 80 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0
Measles	01	00	00	00	00	00	00	00	00	01	02	21	20	+ 5.0 %
Tetanus	00	00	00	00	01	00	00	00	00	05	01	04	16	- 75.0 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	02	03	14	- 78.6 %
Tuberculosis	72	71	12	13	15	04	08	01	33	229	79	1560	1227	+ 27.1 %

Table 2: Newly Introduced Notifiable Disease

20th – 26th February - 2010(08th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2010	Number of cases during same week in 2009	Total number of cases to date in 2010	Total number of cases to date in 2009	Difference between the number of cases to date in 2010 & 2009
	W	C	S	N	E	NW	NC	U	Sab					
Chickenpox	16	01	15	07	05	08	11	02	01	76	213	580	872	- 33.5 %
Meningitis	03 KT=2 GM=1	01 KN=1	02 GL=2	00	02 KM=2	06 KR=5 PU=1	03 AP=1 PL=2	01 BD=1	06 KG=1 RP=5	24	12	299	155	+ 92.9 %
Mumps	02	02	02	02	02	00	00	01	02	13	30	134	298	- 55.0 %
Leishmaniasis	00	00	00	00	00	00	05 AP=5	00	00	05	07	59	57	+ 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.

DPDHS 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, Whooping Cough, Chickenpox, Meningitis, Mumps.

Special Surveillance: Acute Flaccid Paralysis.

Leishmaniasis is notifiable only after the General Circular No: 02/102/2008 issued on 23 September 2008.

Table 4: Selected notifiable diseases reported by Medical Officers of Health

20th – 26th February - 2010(08th Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	72	1031	2	25	0	3	1	13	0	5	16	77	1	3	3	15	0	1	**77**
Gampaha	118	1169	0	6	0	6	2	8	1	2	28	88	1	1	2	19	0	1	**80**
Kalutara	35	242	2	32	1	4	0	4	0	6	7	35	0	0	2	9	0	0	**92**
Kandy	24	356	4	61	0	0	0	2	0	1	0	9	2	29	0	17	0	00	**70**
Matale	20	222	12	140	0	0	0	6	0	36	1	21	0	0	2	12	0	0	**92**
Nuwara	0	38	1	14	0	0	1	23	0	0	0	4	0	15	0	10	0	1	**100**
Galle	19	113	4	32	1	2	0	0	0	4	1	3	1	2	0	4	0	0	**79**
Hambant	35	173	2	9	0	2	0	1	0	0	0	17	3	31	0	2	0	0	**82**
Matara	8	79	3	22	0	1	0	1	0	34	17	40	3	44	0	5	0	0	**94**
Jaffna	34	1625	3	31	0	1	10	186	0	4	0	0	2	75	1	12	0	0	**25**
Kili-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Mannar	7	49	0	11	0	0	0	18	0	0	0	0	0	0	0	8	0	0	**100**
Vavuniya	13	427	1	11	0	1	1	20	0	0	0	0	0	0	0	4	0	0	**75**
Mullaitivu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**20**
Batticaloa	78	575	1	22	0	1	0	5	0	9	0	1	0	1	0	0	0	0	**69**
Ampara	0	21	0	17	0	0	0	2	0	6	1	13	0	0	0	5	0	0	**29**
Trincomal	19	451	1	39	1	3	0	2	0	1	0	6	0	4	1	6	0	0	**50**
Kurunega	34	335	3	51	0	3	0	7	1	1	21	91	3	15	9	24	0	1	**80**
Puttalam	9	372	1	18	1	3	1	23	0	114	17	24	0	0	1	1	0	0	**67**
Anuradha	39	523	2	16	0	0	0	2	0	0	3	10	0	9	0	10	1	4	**58**
Polonnar	13	75	1	17	0	1	0	0	0	2	1	24	0	0	0	13	0	0	**86**
Badulla	10	135	0	36	0	0	3	25	0	6	0	14	2	14	0	12	0	0	**67**
Monaraga	7	80	1	45	0	0	0	14	0	1	0	10	3	12	0	1	0	0	**82**
Ratnapur	18	198	3	58	0	3	0	4	0	8	0	54	0	19	2	32	0	1	**61**
Kegalle	33	213	2	13	0	4	2	14	0	2	8	42	0	4	4	26	0	0	**82**
Kalmunai	18	295	1	30	0	0	0	3	0	0	0	0	0	0	1	6	0	0	**38**
SRI LANKA	**663**	**8797**	**50**	**756**	**04**	**38**	**21**	**383**	**02**	**242**	**121**	**583**	**21**	**278**	**28**	**253**	**01**	**09**	**70**

Source: Weekly Returns of Communicable Diseases WRCD).
*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.
**Timely refers to returns received on or before 26 th February, 2010 Total number of reporting units =311. Number of reporting units data provided for the current week: 255
A = Cases reported during the current week. B = Cumulative cases for the year.

PRINTING OF THIS PUBLICATION IS FUNDED BY THE UNITED NATIONS CHILDREN'S FUND (UNICEF).

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