WEEKLY EPIDEMIOLOGICAL REPORT

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Lurking Menace; Mercury in Healthcare Sector

Chemical Properties of Mercury

Mercury is a naturally occurring heavy metal with a unique feature of being a liquid at room temperature. Its symbol is 'Hg' and the atomic number is 80. Mercury has a relatively high vapour pressure and it strongly dependents upon environment temperature, and it vaporizes readily under ambient conditions. Exposure to mercury in a poorly ventilated confined space under ambient temperature could result in serious health consequences.

Mercury containing medical devices used in the health sector

Since the industrial revolution, mercury is being used to make a wide range of medical appliances due to its physical properties such as high density and uniform rate of expansion. Mercury is found in many medical devices such as thermometers, sphygmomanometres and esophageal dilators. It is also used in many chemicals and measurement devices used in healthcare laboratories. In dentistry, mercury is used extensively for dental amalgam.

Global and local mercury usage in healthcare sector

The global mercury demand was estimated to be 3439 metric tons in 2005. According to a worldwide assessment done in 2013, anthropogenic sources in the different sectors which use mercury, were estimated to be responsible for the emission of 2320 metric tons of mercury annually. This value is projected to be between 2390 – 4860 metric tons in 2050, which is going to raise serious environmental and health issues in the future. Even though no literature is available regarding the contribution of the health sector to the total global mercury emission, according to a study done in United States (US), medical waste incinerators were found to be responsible for 13% of total atmospheric mercury emission in US. Hospitals were found to be responsible for 4%-5% of the total waste water mercury load in some areas in US. Currently no information is available regarding the amount of mercury used in the healthcare sector in Sri Lanka.

There is no evidence regarding the contribution of mercury thermometers and sphygmomanometers to the global mercury demand and global mercury emission. China, which is one of the largest manufactures of mercury thermometers and sphygmomanometers, had consumed 201 metric tons and 81 metric tons of the atmosphere without any apparent leaks. Studies have shown that about 62-87% of sphygmomanometers have mercury leaks which could endanger the health of the healthcare personnel due to chronic mercury exposure.

The potential modes of exposure to elemental

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mercury could be via inhalation, ingestion and skin contact. Out of these, inhalation is the most common potential mode of exposure. Around 80% of the inhaled mercury vapour is absorbed into the blood stream through the lungs and can cross the placenta and blood brain barrier.

Mercury toxicity

People can experience acute toxicity as well as chronic toxicity following a mercury spillage. Acute exposure may occur following a breakage of a thermometer or a sphygmomanometer. If a spillage is not cleaned properly beads of mercury can settle into cracks or cling to porous materials like carpets, fabric or wood, making cleaning of mercury extremely difficult. This will cause healthcare personnel and patients exposed to elemental mercury for long periods. Leaks in sphygmomanometers also will cause chronic mercury exposure due to continuous leaking of mercury into the atmosphere.

Clinical features of acute mercury toxicity

Medical literature indicates that after exposure to mercury, initially one may experience a metallic taste. If the exposure is high, after 3 to 5 hours, the person may develop cough, dyspnoea, chest tightness, lethargy, restlessness, fever and signs of pneumonitis. If the exposure levels are sufficient and especially when accumulation occurs after repeated exposures, signs and symptoms of central nervous system including tremor, and erethism (behavioral disturbances) may arise.

Clinical features of chronic mercury toxicity

Chronic toxicity mainly affects the central nervous system and the kidneys. Tremor, initially involving facial muscles and eyelids, is present at rest, but aggravated by intention. It gradually becomes more pronounced and also starts to affect the limbs. Handwriting becomes illegible, with omission of letters and eventually whole words, Erethism manifests as excessive shyness, loss of confidence, vague fears, irritability, insecurity, and suicidal melancholia. The patient will not be able to perform simple tasks such as dressing. Renal disorders are rare.
Mercury poisoning could be more common than is generally realized. Some of the neurotoxic features may mimic other forms of brain damage thus suspicion of mercury toxicity usually is not aroused.

Disposal of mercury

Proper disposal of mercury is of utmost importance to ensure safety of the environment. A proper mercury disposal system in an institution should have a temporary mercury storage place where hazardous mercury waste is stored until transported to the final treatment station. Being an element mecury can not be broken down or degraded into harmless compounds. Thus best way of managing mercury waste is to recycle, thus less amount enters the environment. Developed countries have well established mercury recycling plants which procure mercury waste from different sectors thus reducing the burden on the environment.

Inappropriately disposed mercury waste ultimately may end up in open dumps, sanitary landfills, incinerators or may be burnt with normal waste, where it is hazardous to the environment. Incineration and burning cause atmospheric pollution due to toxic vapours and mercury disposed into landfills pollute the ground water as well as the atmosphere through landfill gasses.

Global trend in use of mercury containing devices

There is a global movement from various sectors such as WHO, scientists and researchers, that mercury containing devices should be phased out from the healthcare sector. In this regard some countries have already banned mercury from their healthcare institutions while some have taken steps to minimize the use. World Health Organization has proposed to work in collaboration with countries through three strategic steps in order to phase out mercury from healthcare.

Both mercury thermometers and sphygmomanometers have mercury free alternatives which are as accurate as mercury containing devices.

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Table 1: Selected notifiable diseases reported by Medical Officers of Health 25th – 31st March 2017 (13th Week)

RDHS Division	Dengue Fever		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Chickenpox		Meningitis		Leishmani-asis		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	497	7101	1	31	0	1	0	11	0	5	2	22	0	1	0	5	0	0	6	111	1	12	0	1	**75**	**75**
Gampaha	509	4592	0	15	0	10	0	11	0	8	0	23	0	5	0	6	0	1	1	79	0	15	0	4	**20**	**33**
Kalutara	163	1865	2	19	0	2	1	3	1	18	5	71	0	2	0	1	0	0	15	186	0	33	0	0	**64**	**64**
Kandy	46	825	1	29	0	3	0	1	0	0	1	17	9	51	0	6	0	1	4	102	1	14	1	3	**96**	**96**
Matale	23	377	0	7	0	0	0	0	0	0	1	17	0	1	0	4	0	0	0	14	0	24	0	2	**54**	**69**
NuwaraEliya	15	124	0	8	0	1	3	7	0	0	0	11	4	48	0	4	0	0	5	49	1	18	0	0	**92**	**100**
Galle	56	1863	1	16	0	5	1	5	0	9	5	64	1	20	0	0	0	0	7	110	0	17	0	0	**60**	**65**
Hambantota	79	865	0	14	0	3	0	5	0	15	0	15	0	22	1	5	1	1	2	78	1	10	4	121	**83**	**83**
Matara	72	1150	0	15	1	5	0	0	0	2	1	24	2	11	0	3	0	1	4	63	0	2	2	38	**100**	**100**
Jaffna	174	1966	0	83	0	6	0	15	3	28	1	18	10	319	0	4	0	0	7	104	0	18	0	0	**86**	**86**
Kilinochchi	6	174	0	6	0	0	0	3	0	0	0	2	0	9	0	2	0	0	0	0	0	0	0	3	**25**	**25**
Mannar	13	303	0	4	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	4	0	0	0	0	**100**	**100**
Vavuniya	29	277	0	7	0	0	0	12	0	2	0	12	1	3	0	1	0	0	1	15	0	0	0	6	**50**	**50**
Mullaitivu	3	90	0	2	0	0	0	3	0	0	0	7	0	3	0	0	0	0	0	1	0	5	0	1	**0**	**0**
Batticaloa	229	1510	3	45	0	8	0	9	4	5	1	8	0	0	0	4	0	0	4	67	0	13	0	1	**57**	**57**
Ampara	12	161	0	8	0	1	0	1	0	0	0	6	0	1	0	2	0	0	4	61	2	19	0	2	**71**	**86**
Trincomalee	425	3162	1	4	0	1	0	3	0	1	1	7	0	7	0	7	0	0	1	50	4	10	0	1	**85**	**85**
Kurunegala	131	1289	0	23	0	0	0	0	0	2	2	33	1	18	0	5	0	0	3	209	0	16	2	42	**59**	**62**
Puttalam	42	540	0	17	0	1	0	1	0	0	0	4	0	10	0	1	0	0	0	70	0	13	0	1	**50**	**50**
Anuradhapur	52	568	0	14	0	1	0	0	0	3	0	24	0	9	0	7	0	0	8	123	0	20	3	98	**32**	**37**
Polonnaruwa	71	1246	0	7	0	4	1	5	0	0	0	13	0	3	0	1	0	0	6	81	0	6	2	44	**71**	**71**
Badulla	30	216	1	33	0	4	0	4	0	1	0	19	1	15	0	14	0	1	2	91	2	56	0	6	**82**	**82**
Monaragala	28	495	1	14	0	3	0	0	0	2	3	36	1	52	1	11	0	0	1	31	2	20	0	4	**82**	**82**
Ratnapura	26	306	3	66	2	40	0	4	0	3	6	130	0	14	2	23	0	0	3	127	1	66	0	0	**50**	**50**
Kegalle	95	1306	0	16	0	4	0	2	0	14	0	16	0	28	0	5	0	0	2	88	0	26	0	4	**64**	**64**
Kalmune	69	817	0	18	0	4	0	1	0	5	0	3	0	0	0	0	0	0	0	84	0	4	0	0	**15**	**15**
SRILANKA	**2908**	**33188**	**14**	**521**	**3**	**107**	**6**	**107**	**8**	**123**	**39**	**602**	**30**	**654**	**4**	**121**	**1**	**5**	**86**	**1998**	**15**	**427**	**14**	**382**	**64**	**67**

Source: Weekly Returns of Communicable Diseases (WRCD).

*T=Timeliness refers to returns received on or before 31st March , 2017 Total number of reporting units 337 Number of reporting units data provided for the current week: 233 C**-Completeness

Table 2: Vaccine-Preventable Diseases & AFP

25th – 31st March 2017 (13th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2017	Number of cases during same week in 2016	Total number of cases to date in 2017	Total number of cases to date in 2016	Difference between the number of cases to date in 2017 & 2016
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	01	00	00	00	00	01	00	26	14	85.7%
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0%
Mumps	00	01	01	00	00	02	00	00	01	05	05	83	106	- 21.6%
Measles	00	00	01	00	00	00	00	00	01	02	14	92	200	- 54%
Rubella	00	00	00	00	00	00	00	00	00	00	00	05	05	0%
CRS**	00	00	00	00	00	00	00	00	00	00	00	00	00	0%
Tetanus	00	00	00	01	00	00	00	00	00	01	00	06	02	200%
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	21	00	0%
Whooping Cough	00	00	00	00	00	00	00	00	00	00	01	04	22	- 81.8%
Tuberculosis	66	04	07	01	07	00	04	04	05	98	156	1944	2274	- 14.5%

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

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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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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