



WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
Ministry of Health, Nutrition & Indigenous Medicine

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Microplastics and their impacts on the environment and humans

What are microplastics?

Microplastics are plastic fragments of any type < 0.5mm (0.2 inches) in length. This term was introduced primary and secondary.

Primary microplastics are originally manufactured as small pieces of plastic. They are usually used in cosmetics (eg: facial scrubs, cleansers), toothpaste, microfibers from clothing, microbeads, plastic pellets & air blasting technology used in the process of blasting acrylic, melamine, polyester microplastic scrubbers at machinery, engines and boats to remove rust and paint. Secondary microplastics are the small breakdown products of larger plastic debris, both at sea and on land due to physical, biological and chemophotodegradation including oxidation by exposure to the sun. So such primary sources are water bottles, soda bottles, tea bags, plastic bags, tire wear, disposable face masks and fishing nets etc. In addition, microplastics enter the environment from the washing of synthetic clothing.



What are nano plastics?

Nanoplastics are plastic fragments that are very small in size (ie. < 1 micrometre/1000nm in length). They are an invisible

threat to the environment and human health. Unlikely microplastics which only remain in the digestive tracts of sea animals, these can cross cellular membranes and affect the functioning of cells by cooperating with the lipid bilayer. So nano plastics can enter into muscles of fish, the parts which are consumed by humans. They can also accumulate in the Gall bladder, Pancreas and brain of sea creatures as well as alter glucose and cortisol levels of blood which affect their immune and stress response, growth and reproduction.

What are the major sources of microplastic?

Agriculture runoff, aquaculture, Cruise ships, ocean dumping, stormwater, the shipping and fishing industries, urban runoff and waste management are the major sources of microplastics. > 80% of microplastics in the environment derive from textiles, tires And city dust.

Where in the environment can we find microplastics?

They are found in oceans, lakes, water-



ways, soil, air and even in our food (such as salt, honey, and sugar). Because of their small size, they

are readily transported by the wind even to the remotest parts of the earth including mountainous and Polar Regions. So they are found everywhere.

What is the global burden of microplastics?

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WEEKLY EPIDEMIOLOGICAL REPORT SRI LANKA 2022

Global production of microplastics is estimated to be around 300 million tons per year whereas plastic pollution in the marine environment alone is approximately 9.5 million tons annually.

What is the burden of microplastics in Sri Lanka?

Sri Lanka’s municipal solid waste production is around 10,768 tons per day and out of that average plastic waste compromised 6.89%. Out of 44,100 metric tons of fabric waste, 28% is a synthetic material. Also, only 1/3 of total generated waste is collected while most uncollected waste is dumped in the open and surrounding environment.

What are the hazardous effects on the environment?

Once these microplastics are washed through waterways they will end up in marine ecosystems and soil ecosystems. As plastics degrade slowly (hundreds and thousands of years) there is a high chance of them being digested by animals on land and water. These effects are mainly studied in marine ecosystems. So the sea creatures will face a lot of health problems such as fatal abrasions in their digestive systems, disruption of reproduction, shunting of growth, reduction of appetite, tissue inflammation and liver damage. Also, microplastics act as reservoirs for vectors and other toxic chemical pollutants leading to additional health risks for these creatures. These microplastics are first ingested by the zooplanktons (small aquatic microorganisms which are the intermediary species in the food chain. These mainly depend on the algae and some on other zooplanktons.). These zooplanktons are then ingested by other sea animals and ultimately by the humans who are at the top most end of the food chain. These microplastics and associated toxic chemicals will accumulate in increasing concentrations when going up in the food chain causing increasing health hazards.



What are the health impacts on humans?

Per year humans are ingesting > 100,000 microplastics through drinking water as well as foods like salt, sugar etc. Over the years our bodies have been used to natural polymers (plant foods, animal foods etc.). But we do not

know how the body will react to these man-made polymers like microplastics. No studies have been done directly to study the effects of microplastics on humans. Current research available either exposes human cells/tissues to microplastics or investigates animals (eg: mice). But according to those data in research microplastics may be hazardous to our health. They might act as irritants to our tissues causing metabolic disturbances, neurotoxicity, and carcinogenic effects. They also can act as endocrine disruptors, therefore, interfering with normal



hormone activity and causing weight gain. Some can interfere with fetal brain development which affects normal brain developments in children.

How can we reduce the burden of microplastics?

It is of utmost importance to prevent the accumulation of microplastics. Now, most industries have started to produce packaging out of recycled plastics. Some countries have banned using microbeads in personal care products. Using renewable materials like plant matter instead of plastics, using good quality plastics that can be used for long-term instead of disposable plastic after a single use and using glass bottles and containers are other methods that can be used to reduce the environmental burden of microplastics. IUCN (International Union for Conservation of Nature and Natural Resources) had proposed EPR (Extended Producer Responsibility) principle. In this approach, the plastic producer should be fully responsible for the plastic product he produces and he should also be responsible for the proper recovery and recycling of the product after disposal.

Ministry of Environment, Sri Lanka has created a national action plan on plastic waste management 2021-2030 using the 3R method-Reduce, Reuse and Recycle. That means to reduce plastic waste, the disposed plastics are reused or recycled to use as raw material in another industry. So, this circular economy will have a dual benefit by reducing plastic waste as well as reducing the cost of raw materials in some industries.

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Table 1: Selected notifiable diseases reported by Medical Officers of Health 05th- 11th Feb 2022 (06th Week)

RDHS	Dengue Fever		Dysentery		Encephaliti		Enteric Fever		Food Poi-		Leptospirosis		Typhus		Viral Hep-		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	12	1551	0	2	0	0	0	0	0	3	1	9	0	0	0	0	0	0	0	0	4	0	0	1	1	100	
Gampaha	63	1412	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	4	0	2	0	0	0	72	
Kalutara	25	410	0	3	0	0	0	0	5	0	42	0	1	0	1	0	0	0	1	8	0	5	0	0	0	100	
Kandy	30	369	0	3	0	0	0	0	0	0	16	0	3	0	3	0	0	0	1	6	1	1	1	1	1	96	
Matale	7	77	0	0	0	0	0	0	0	0	1	8	0	0	0	0	0	0	3	5	0	0	3	41	4	100	
NuwaraEliya	4	32	0	3	0	0	0	0	0	0	1	7	0	2	0	0	0	0	1	0	0	0	0	0	5	100	
Galle	21	372	0	0	0	0	0	0	0	0	5	65	0	3	0	0	0	0	4	0	3	0	0	0	0	100	
Hambantota	4	138	15	20	0	0	0	0	0	0	5	22	1	5	0	1	0	0	1	0	1	0	1	2	65	3	100
Matara	8	127	0	1	0	0	0	0	0	0	4	21	0	0	0	0	0	0	2	0	1	0	1	0	2	100	
Jaftna	55	526	2	5	0	1	15	0	7	0	8	16	151	0	2	0	0	0	0	16	0	2	0	0	24	88	
Kilinochchi	3	30	0	1	0	0	0	0	0	6	0	1	0	3	0	0	0	0	0	0	0	0	0	1	25	100	
Mannar	8	131	0	1	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	1	8	0	0	28	83	
Vavuniya	0	24	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	92	
Mullaitivu	1	14	0	0	0	0	2	0	0	0	0	6	0	2	0	0	0	0	2	0	0	0	0	0	8	100	
Batticaloa	26	155	2	11	0	1	0	0	0	0	1	6	0	0	0	0	0	0	2	0	2	0	6	0	21	100	
Ampara	1	33	0	2	0	0	0	0	0	0	1	18	0	1	0	0	0	0	2	9	0	3	0	4	7	100	
Trincomalee	3	146	0	1	0	0	1	0	0	0	0	3	0	0	0	4	0	0	0	0	2	0	2	0	21	92	
Kurunegala	29	727	0	2	0	1	0	0	0	0	0	20	0	7	0	0	0	0	3	8	2	4	3	70	0	100	
Puttalam	38	525	0	0	0	0	0	0	0	0	6	0	2	0	0	0	0	0	0	0	8	0	1	8	92		
Anuradhapur	7	80	0	0	0	0	0	0	0	0	43	0	3	0	1	0	1	0	2	4	0	2	2	62	0	92	
Polonnaruwa	0	30	0	1	0	0	0	0	1	0	30	0	0	0	0	0	0	0	1	1	0	1	6	41	0	88	
Badulla	8	280	0	4	0	0	0	0	0	0	4	34	0	6	1	12	0	0	3	0	1	0	4	0	0	100	
Monaragala	3	51	0	0	0	0	2	0	1	6	64	0	3	0	5	0	0	0	5	0	6	1	12	0	0	100	
Ratnapura	28	341	0	8	1	3	0	1	0	14	8	131	0	4	0	4	0	0	1	7	1	4	6	35	0	95	
Kegalle	5	230	1	2	0	0	1	0	3	1	76	0	2	0	0	0	0	0	7	0	5	0	2	0	0	100	
Kalmune	14	63	1	12	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	2	0	2	0	0	18	100	
SRI LANKA	51	7874	21	82	1	7	1	22	0	40	40	653	17	198	1	33	0	1	15	102	5	67	24	372	5	95	

Source: Weekly Returns of Communicable Diseases (esurveillance.epid.gov.lk). T=Timeliness refers to returns received on or before 11th Feb, 2022 Total number of reporting units 361 Number of reporting units data provided for the current week: 344 C**-Completeness

Table 2: Vaccine-Preventable Diseases & AFP 05th – 11th Feb 2022 (06th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2022	Number of cases during same week in 2021	Total number of cases to date in 2022	Total number of cases to date in 2021	Difference between the number of cases to date in 2022 & 2021
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	01	00	00	00	01	00	00	00	02	04	09	10	- 10 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Mumps	00	00	00	00	00	00	00	01	00	01	02	05	09	- 44.4 %
Measles	00	01	00	00	00	00	00	00	00	01	00	04	03	33.3 %
Rubella	00	00	00	00	00	00	00	00	00	00	00	00	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	01	00	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	01	00	0 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Tuberculosis	05	13	04	07	02	09	11	04	00	55	93	953	722	31.9 %

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

Covid-19 Prevention & Control

For everyone's health & safety, maintain physical distance, often wash hands, wear a face mask and stay home.

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**

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