



WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
Ministry of Health & Indigenous Medical Services

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Air pollution Part II

This is the last in a series of two articles on Air Pollution

WHO Air quality guideline values

Fine particulate matter (PM_{2.5})

10 µg/m³ annual mean
25 µg/m³ 24-hour mean

Coarse particulate matter (PM₁₀)

20 µg/m³ annual mean
50 µg/m³ 24-hour mean

"WHO air quality guidelines" estimate that reducing annual average fine particulate matter (PM_{2.5}) concentrations from levels of 35µg/m³, to the WHO guideline level of 10 µg/m³, could reduce air pollution-related deaths by around 15%.

The PM_{2.5} concentration in Sri Lanka (2019) was 2 times above WHO exposure recommendation.

Ozone (O₃)

Ozone at ground level is one of the major constituents of photochemical smog. It is formed by the reaction with sunlight (photochemical reaction) of pollutants such as nitrogen oxides from the vehicle and industry emissions and volatile organic compounds emitted by vehicles, solvents and industry. As a result, the highest levels of ozone pollution occur during periods of sunny weather.

Guideline values

100 µg/m³ 8-hour mean
Excessive ozone in the air can trigger asthma, reduce lung function and cause lung diseases.

Nitrogen dioxide (NO₂)

NO₂ is the main source of nitrate aerosols, which form an important fraction of PM_{2.5} and ozone in the presence of UV light. The major sources of anthropogenic emissions of NO₂ are combustion processes (heating, power generation, and engines in vehicles and ships). At short-term, concentrations exceeding 200µg/m³, it is a toxic gas which causes significant inflammation of the airways.

Guideline values

40 µg/m³ annual mean
200 µg/m³ 1-hour mean

Long-term exposure to NO₂ known to cause symptoms of bronchitis in asthmatic children and also known to reduce the lung function.

Sulphur dioxide (SO₂)

SO₂ is a colourless gas with a sharp door. It is produced from the burning of fossil fuels (coal and oil) and the smelting of mineral ores that contain sulphur. The main anthropogenic source of SO₂ is the burning of sulphur-containing fossil fuels for domestic heating, power generation and motor vehicles.

An SO₂ concentration of 500 µg/m³ should not be exceeded over average periods of 10 minutes duration. Studies indicate that a proportion of people with asthma experience changes in pulmonary function and respiratory symptoms after periods of exposure to SO₂ as short as 10 minutes.



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Guideline values

20 µg/m³ 24-hour mean
500 µg/m³ 10-minute mean

SO₂ can affect the respiratory system and the functions of the lungs and causes irritation of the eyes. Inflammation of the respiratory tract causes coughing, mucus secretion, aggravation of asthma and chronic bronchitis and makes people more prone to infections of the respiratory tract. When SO₂ combines with water, it forms sulfuric acid; this is the main component of acid rain which is a cause of deforestation.

Indoor Air Pollution

Around 3 billion people especially from the low and middle-income countries, cook using polluting open fires or simple stoves fuelled by kerosene, biomass (wood, animal dung and crop waste) and coal. In poorly ventilated dwellings, indoor smoke can be 100 times higher than acceptable levels for fine particles. Exposure is particularly high among women and young children, who spend more time at home.

Each year, close to 4 million people die prematurely from illness attributable to household air pollution from inefficient cooking practises using polluting stoves paired with solid fuels and kerosene. Most of the burden is in low-middle-income countries.

Household air pollution causes non-communicable diseases including stroke (18%), ischemic heart disease (27%), chronic obstructive pulmonary disease (20%) and lung cancer (8%). Close to half of deaths due to pneumonia among children under 5 years of age are caused by particulate matter (soot) inhaled from household air pollution.

Household air pollution is also a major source of outdoor air pollution in both urban and rural areas.

Pneumonia

Exposure to household air pollution almost doubles the risk for childhood pneumonia and it is responsible for 45% of all pneumonia deaths in children less than 5 years old and 28% of all adult deaths due to pneumonia.

Chronic obstructive pulmonary disease

Nearly 25% of deaths from chronic obstructive pulmonary disease (COPD) in adults in low- and middle-income countries are due to exposure to household air pollution. Women exposed to high levels of indoor smoke are more than twice likely to suffer from COPD than women who use cleaner fuels and technologies. Among men (who already have a heightened risk of COPD due to their higher rates of smoking), exposure to household air pollution nearly doubles that risk.

Stroke

Nearly 12% of all deaths due to stroke can be attributed to the daily exposure to household air pollution arising from cooking with solid fuels and kerosene.

Ischemic heart disease

Approximately 11% of all deaths due to ischemic heart disease, accounting for over a million premature deaths annually, can be attributed to exposure to household air pollution.

Lung cancer

Approximately 17% of lung cancer deaths in adults are attributable to exposure to carcinogens from household air pollution caused by cooking with kerosene or solid fuels like wood, charcoal or coal. The risk for women is higher, due to their role in food preparation.

Other health impacts and risks

More generally, small particulate matter and other pollutants in indoor smoke inflame the airways and lungs, impairing immune response and reducing the oxygen-carrying capacity of the blood.

There is also evidence of links between household air pollution and low birth weight, tuberculosis, cataract, nasopharyngeal and laryngeal cancers.

The air pollution is a global challenge and countries can't tackle it alone. The energy-efficient power generation, improvement of the domestic, industry and municipal waste management, reduction of agricultural waste incineration and forest fires, building up of more greener cities with energy-efficient buildings, providing universal access to clean, affordable fuels and technologies for cooking, heating and lighting, building up of safe, affordable public transport systems and pedestrian and cycle-friendly networks are some of the solutions to reduce air pollution.

Since the air pollution is a global challenge, all the countries need to take necessary immediate actions to combat it together.

References:

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2. World Health Organization: WHO. (2018b, May 8). *Household air pollution and health*. WHO. <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health#:~:text=Household%20air%20pollution%20causes%20noncommunicable,inhaled%20from%20household%20air%20pollution>

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Table 1: Selected notifiable diseases reported by Medical Officers of Health 20th- 26th June 2020 (26th 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	58	3185	0	14	1	6	0	4	0	14	20	172	0	1	0	2	0	0	2	173	0	21	0	1	57	99	
Gampaha	55	1940	1	7	0	1	0	5	0	19	10	126	0	1	0	4	0	0	7	218	3	13	1	19	44	99	
Kalutara	77	1328	1	7	0	4	0	4	0	4	18	407	1	13	1	3	0	0	4	240	2	26	0	0	51	100	
Kandy	150	1793	0	16	0	1	0	7	0	10	12	121	2	67	0	4	0	0	2	130	0	18	2	45	63	100	
Matale	4	483	0	5	0	3	1	2	0	6	5	62	1	4	1	4	0	1	0	45	0	2	13	187	64	99	
NuwaraEliya	5	135	0	15	0	1	0	1	0	7	6	55	0	61	0	3	0	0	1	65	0	9	0	0	22	100	
Galle	1	1096	0	13	0	8	0	2	0	12	2	240	2	26	0	2	0	0	0	211	0	20	0	2	55	65	
Hambantota	3	290	0	7	1	2	0	2	0	38	11	134	5	29	0	2	0	0	2	147	1	23	8	348	67	100	
Matara	0	352	0	9	0	3	0	0	0	0	1	101	0	4	0	6	0	0	0	68	0	5	0	117	46	41	
Jaffna	10	1913	1	56	0	0	0	19	0	20	1	17	1	465	0	0	0	1	0	85	0	7	0	0	30	93	
Kilinochchi	1	116	0	30	0	2	0	10	2	10	1	16	0	24	0	1	0	0	0	12	0	9	0	10	64	100	
Mannar	1	122	0	0	0	0	0	1	0	0	0	5	0	1	0	0	0	0	0	2	0	3	0	0	40	99	
Vavuniya	1	239	0	9	0	0	0	5	0	2	1	37	0	1	0	0	0	0	0	29	0	4	0	1	66	100	
Mullaitivu	0	65	0	5	0	0	0	5	0	1	0	14	0	6	0	1	0	2	1	7	0	4	0	5	46	79	
Batticaloa	17	2199	2	54	0	3	0	1	0	44	1	23	0	0	0	4	0	1	0	73	0	16	0	1	51	100	
Ampara	2	298	1	12	0	2	0	0	0	0	2	77	0	0	0	1	0	0	1	93	0	13	0	4	67	100	
Trincomalee	4	2250	1	12	0	0	0	0	0	2	1	25	1	4	0	0	0	0	4	80	0	8	0	0	47	91	
Kurunegala	14	731	1	12	0	4	0	2	0	35	2	135	1	19	2	4	0	2	2	269	3	16	17	248	46	99	
Puttalam	2	393	0	8	0	4	0	3	0	1	5	45	0	13	0	0	0	1	2	70	1	34	1	4	57	100	
Anuradhapur	4	359	0	16	0	1	0	4	1	23	9	173	1	15	1	6	0	1	2	157	4	30	0	120	44	96	
Polonnaruwa	6	210	0	5	0	0	0	0	0	5	3	108	0	0	1	15	0	1	2	109	0	11	16	143	66	93	
Badulla	8	408	2	12	0	4	0	3	0	3	12	205	1	53	1	11	0	0	2	123	0	26	2	13	58	100	
Monaragala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ratnapura	91	1239	3	53	1	15	2	5	2	24	44	983	1	23	0	13	0	0	2	146	6	72	2	66	48	100	
Kegalle	29	545	0	15	0	4	0	3	1	16	17	257	2	32	0	6	0	0	2	133	5	29	1	17	58	100	
Kalmune	2	855	0	36	0	3	0	0	0	1	0	13	0	2	1	2	0	0	0	263	2	31	0	0	70	100	
SRI LANKA	545	22544	13	428	3	71	3	88	6	297	18	3551	19	864	8	94	0	10	38	2948	27	450	63	1351	53	90	

Source: Weekly Returns of Communicable Diseases (WRCD).

*T=Timeliness refers to returns received on or before 26th June, 2020 Total number of reporting units 356 Number of reporting units data provided for the current week: 287 C**=Completeness

Table 2: Vaccine-Preventable Diseases & AFP

20th– 26th June 2020 (26th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2020	Number of cases during same week in 2019	Total number of cases to date in 2020	Total number of cases to date in 2019	Difference between the number of cases to date in 2020 & 2019
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	01	00	00	00	00	00	01	03	19	43	- 55.8 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Mumps	01	02	00	00	00	00	01	00	01	05	09	96	186	- 48.3 %
Measles	00	00	00	00	00	00	00	00	00	00	07	31	177	- 82.4 %
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	01	03	10	- 70 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Japanese Encephalitis	01	00	00	00	01	00	00	00	00	02	00	23	09	155.5 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	01	05	34	- 85.2 %
Tuberculosis	33	05	10	07	17	00	21	14	14	121	198	2713	4314	- 37.1 %

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

Number of Malaria Cases Up to End of June 2020,

07

All are Imported!!!

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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