



WEEKLY EPIDEMIOLOGICAL REPORT

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

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Energy- Indoor Air Pollution & Health

Indoor air pollution can be caused by many sources. Common indoor air pollutant sources are moulds, pollen, and dander from pet fur, smoke, formaldehyde, carbon products such as cleansers & pesticides and the burning of biomass fuels, and kerosene. This article mainly focuses on biomass fuel and kerosene used for cooking, lighting, and heating homes.



Biomass fuels such as wood, coal, animal dung, and crop waste are one of the common sources of indoor air pollution as well as a leading risk factor for premature deaths & morbidity worldwide. Approximately 2.4 billion people use solid fuels and kerosene for cooking in open fires or ineffective polluting stoves. People who use them are mostly poor and are from rural (rather than urban) areas in low- and middle-income countries (like Asia and Sub-Saharan Africa). As women are the ones who are engaged in cooking and children are also with them at home most of the time, they are at a higher risk of their effects.

Indoor air pollution resulting from exposure to solid fuel is estimated to be more than 1.5 a million premature deaths and 38.5 million Disability-Adjusted Life Years. There is emerging evidence that the actual burden is much larger than the estimated

values. WHO has estimated the number of deaths related to indoor air pollution and outdoor air pollution in Sri Lanka to be 4200 and 1000 deaths, respectively.

How does biomass fuel affect our health?

Cooking activities may emit particulate matter (PM_{2.5}) as well as gaseous pollutants such as polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC), oxides of carbon (CO_x) and oxides of nitrogen (NO_x). These are produced not only by biomass fuel but also by food remains which fell on stoves even electrical and gas stoves, burning of kerosene, candles, and heated oil in frying. These by-products can affect human health.



What are PM_{2.5} and UFPs?

PM_{2.5} are fine particulate matter which can cause negative health impacts when its levels are high. These are very tiny droplets in the air that are two and a half microns in width (25000 microns= 1inch). These particles can be produced not only by combustion of biomass fuel but also by vehicle exhausts, construction equipment exhausts, forest, grass fires, burning oil lamps and candles, tobacco smoke and kerosene heaters. National Ambient Air quality standards for PM_{2.5} (revise in 2006

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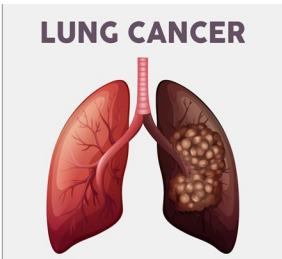
and 2012) are 35 microgram/mm³ - for the short term and 12 microgram/mm³ - for the long term. As these particles are so small, they can be carried away by the wind from their source of origin. Though they are invisible to the naked eye when these particles are high you can see a mist/fog in the atmosphere.

Ultra-fine particles (UFPs) are very small particles that are < 100nm diameters in size. Due to their smaller size and larger surface area, they are more harmful than PM_{2.5}. Also, numerically they are more in a sample of PM



High emission of PM_{2.5} depends on various factors like cooking style, temperature, type of stove and ventilation etc. Therefore, high average PM_{2.5} concentrations are seen during frying (rather than boiling), during high-temperature cooking and when using wood-burning stoves.

What are the negative health outcomes?



People who are at risk of negative health outcomes are children, elderly people and those who are suffering from long-term cardiac and respiratory problems. PM_{2.5} are very small that they can travel deeply into the respiratory tract-reaching the alveoli. So, they can increase asthma and heart disease, and affect lung function in the short term. In long term, they may result in chronic bronchitis and lung cancer, heart diseases and hypertension.

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What are the preventive methods to reduce the burden of indoor air pollution?

There are mainly 3 ways to reduce indoor air pollution- **source control, improved ventilation, and air cleaners.**



Among all, the most effective way is to control the source (eliminate the source/reduce emissions). That means we must replace inefficient energy using techniques with affordable, reliable, efficient, clean, and safe techniques. So, the traditional wood-burning stoves and kerosene stoves should be replaced by gas or electric stoves. These stoves also contribute to some indoor air pollution, but it is low compared to traditional methods. When thinking of efficiency and air quality the best option is induction stoves as they

use magnets to transfer heat directly to the pots /pans. No red element means no particulate matter.

Improving ventilation can be done by using range hoods (exhaust air and filter the pollutants in the air), cooking on back burners if possible so that the range hood can exhaust the cooking fumes more efficiently and keeping windows and doors open outside to let fresh air flow. If there are no windows and doors can use an exhaust fan in the kitchen. Proper ventilation may remove or dilute the polluted air and may reduce the risk to human health.

Air cleaners are only adjuncts to the source control and cannot use alone. The effectiveness of an air cleaner depends on how much air it draws through the filtering elements and how efficiently it cleans that polluted air. Both should come hand in hand to be a good type of air cleaner. But if the strength of the pollutant source is very high or if the source is very close to the air cleaner their effectiveness may be very much lower.

Sri Lanka has made an action plan to achieve clean air in 2025 by the Ministry of Mahaweli Development & Environment. In that, they have planned many strategies such as “Identify different types of buildings/locations that the guideline should be applied, conduct pilot scale indoor air pollution studies for major cities, conduct exposure studies on health impact assessment, conduct awareness programmes on methods to reduce indoor air pollution, Review the existing building regulations and incorporate indoor air quality guidelines.” As in Sri Lanka in the recent past, indoor pollution is more than outdoor pollution it is of utmost importance to implement these strategies and reduce negative health burden in near future.

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Table 1: Selected notifiable diseases reported by Medical Officers of Health 04th- 10th Jun 2022 (23rd 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	31	4068	0	2	0	2	0	0	0	5	19	72	0	0	0	2	0	0	0	0	15	0	4	0	2	14	96
Gampaha	72	2676	0	4	0	1	0	0	12	2	53	0	0	0	4	0	2	2	3	18	0	13	0	8	6	65	
Kalutara	83	1561	0	4	0	1	0	1	6	11	151	0	2	0	1	0	2	3	30	1	14	0	1	2	48		
Kandy	12	1208	0	10	0	0	0	1	4	2	61	2	19	0	6	0	0	1	27	0	4	4	1	6	11	95	
Matale	21	272	0	1	0	0	0	0	0	0	3	48	0	3	0	1	0	0	9	0	1	0	9	175	17	99	
NuwaraEliya	8	88	0	13	0	0	0	0	0	0	6	28	0	10	0	0	0	0	3	16	0	2	0	0	17	98	
Galle	11	1549	0	5	0	0	0	0	0	0	9	187	2	11	0	2	0	0	2	32	0	11	0	0	11	98	
Hambantota	20	465	0	24	0	0	0	0	2	3	88	1	20	0	3	0	0	0	14	0	6	10	228	16	98		
Matara	58	591	1	9	0	0	0	0	0	12	120	1	6	0	1	0	0	1	17	1	6	11	153	27	100		
Jaiffna	10	1916	4	23	0	2	6	48	2	23	0	18	4	385	0	5	0	4	2	62	0	8	0	0	62	88	
Kilinochchi	0	73	0	4	0	0	0	0	1	17	0	11	0	8	0	0	0	0	4	0	0	0	1	34	98		
Mannar	5	159	0	1	0	0	0	0	0	0	1	13	1	3	1	2	0	0	1	5	0	15	0	0	22	79	
Vavuniya	5	52	0	0	0	1	0	2	0	0	10	0	1	0	0	0	0	0	5	0	0	0	2	3	72		
Mullaitivu	1	34	0	3	0	0	0	2	0	3	20	0	4	0	0	0	0	0	4	0	0	0	1	25	98		
Batticaloa	33	797	1	44	0	5	0	0	17	0	26	0	0	0	1	0	1	0	7	0	20	0	1	35	100		
Ampara	4	78	0	6	0	1	0	0	17	8	63	0	1	0	1	0	0	1	33	1	12	1	12	9	99		
Trincomalee	16	808	0	22	0	0	0	1	0	2	14	0	3	0	4	0	0	2	28	0	4	0	0	18	88		
Kurunegala	44	1292	0	8	0	1	0	0	4	6	72	1	18	0	0	0	1	1	32	1	19	12	247	8	99		
Puttalam	23	1033	0	3	0	0	0	0	0	3	13	0	5	0	0	0	0	1	6	2	17	0	4	15	90		
Anuradhapur	3	187	0	8	1	1	0	1	0	5	0	98	0	14	0	2	0	1	2	25	0	21	1	207	9	88	
Polonnaruwa	1	54	1	4	0	0	0	0	1	3	55	0	0	0	1	0	0	1	8	0	3	2	201	16	84		
Badulla	31	491	2	11	1	1	0	0	5	1	107	0	26	3	69	0	0	2	28	1	8	0	11	12	100		
Monaragala	12	175	0	5	0	0	0	4	0	2	181	0	14	2	25	0	0	1	36	2	22	2	75	8	99		
Ratnapura	40	1140	3	25	0	5	0	2	1	19	27	419	1	12	1	14	0	0	37	3	23	0	109	12	95		
Kegalle	68	811	0	7	0	5	0	1	0	5	13	225	0	10	0	3	0	2	52	2	22	1	12	7	99		
Kalmune	37	504	0	22	0	0	0	0	1	5	1	13	0	1	0	0	0	3	29	2	16	0	0	29	100		
SRILANKA	12	22082	12	268	2	26	6	63	5	154	13	2166	13	576	7	14	0	11	32	579	16	271	50	1456	16	93	

Source: Weekly Returns of Communicable Diseases (esurveillance.epid.gov.lk). T=Timeliness refers to returns received on or before 10th June, 2022 Total number of reporting units 361 Number of reporting units data provided for the current week: 287 C**-

Table 2: Vaccine-Preventable Diseases & AFP

04th – 10th Jun 2022 (23rd 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*	02	00	00	00	00	00	00	00	00	02	00	38	23	65.2 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Mumps	00	00	00	00	01	00	00	00	00	01	00	28	43	- 34.8 %
Measles	00	00	00	00	00	00	00	00	00	00	01	12	10	20 %
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	05	02	150 %
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	01	00	0 %
Tuberculosis	00	02	07	14	16	14	00	15	00	68	11	2875	2591	10.9 %

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.

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ON STATE SERVICE

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