



WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
Ministry of Healthcare and Nutrition

231, de Saram Place, Colombo 01000, Sri Lanka

Tele: + 94 11 2695112, Fax: +94 11 2696583, E mail: epidunit@sltnet.lk

Epidemiologist: +94 11 2681548, E mail: chepid@sltnet.lk

Web: <http://www.epid.gov.lk>

Vol. 37 No.10

06th - 12th March 2010

High quality drinking water through Bio-Sand Filter (part 1)

Water is a vital resource, crucial to life of living being and essential for overall economic and social development of a country. United Nations Assembly proclaimed the period from 2005-2015 as the International Decade for Action - "Water for Life". The Millennium Development Goal had set out specific targets (MDG goal 7, target 3) related to water and sanitation to halve the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015.

According to the National Water Supply and Drainage Board (NWSDB), water supply coverage by them in the country was 74% in 2005. A majority of the people without access to safe water supply live in rural areas. About 75% of the urban population benefit from pipe borne water supply, compared to 14% of the rural population in 2002¹.

Table1: Access to Safe Drinking Water by Province–Households

n.a. = not available.

Source: UNDP. 2005. *Millennium Development Goals Country Report: Sri Lanka*. Colombo.

Table 1

Province	1993	1994	2001
Western	85.7	84.1	91.5
Central	70.5	62.5	78.3
Southern	66.9	62.1	80.5
Northern	n.a.	n.a.	n.a.
Eastern	n.a.	n.a.	n.a.
North Western	81.7	74.9	87.9
North Central	67.1	69.1	80.5
Uva	62.7	47.3	67.9
Sabara muwa	50.2	47.5	63.8
Sri Lanka	74.1	68.4	82.0

Water Epidemiology

Absolute pure water is rare and contaminants are usually present in every source of water, some contaminants are essential for life while some can be deadly even with small amounts. Water is polluted from organic agents, inorganic agents, infectious agents, toxic agents and sediments. Organic agents come from sewerages and industries. They promote growth of natural populations of aquatic bacteria as well as algae.

Untreated or improperly treated sewage, animal wastes and meat-packing wastes etc. are major sources of contamination of water. They contain pathogenic bacteria, viruses, protozoa and parasites which invariably add to the contaminated water, ultimately giving rise to waterborne diseases to the consumer. Waterborne infectious diseases cause a special problem in developing nations with poorly developed sewage treatment facilities. Over five million children die every year from diarrhoeal diseases and dehydration. Children become at risk of stunting due to malnutrition caused by repeated attacks of diarrhoeal diseases, following consumption of contaminated water. People are more prone to get

Contents	Page
1. Leading Article - High quality drinking water through Bio- Sand Filter	1
2. Surveillance of vaccine preventable diseases & AFP (26 th February - 05 th March 2010)	3
3. Summary of newly introduced notifiable diseases (26 th February - 05 th March 2010)	3
4. Summary of selected notifiable diseases reported (26 th February - 05 th March 2010)	4

eye infections and skin infections like scabies, classified as water washed diseases, as a result of insufficient water to maintain cleanliness. Different pathogenic organisms present in polluted water and their infectious dose is shown in

Table2

Table 02. Human Infectious Doses of Certain Pathogen Types		
Pathogen Type	Organism	Infectious Concentration (Minimum number of organisms required for infection)
Bacteria	E. Coli	100 to 1,000,000,000
	E. Coli 0157: H7	100
	Salmonella	1,000,000 to 10,000,000
	Cholera Vibrio	100,000,000
	Shigella	100
Viruses	Enterovirus	1 to 72
	Adenovirus, Polio Echovirus, Coxsackie, Hepatitis A, Reovirus	<100
	Protozoa	
Protozoa	Enteric Amoeba	10 to 100
	Giardia lamblia	1 to 10
	Cryptosporidium Parvum	10 to 30
Helminths	Round worm, pin worm, Tapeworm, whipworm, most types	< 10
	Dwarf Tape-worm	< 100

Source: Water Epidemiology and Microbiology, Project Implementation Workshop Reference Manual 2006, Center for Affordable Water and Sanitation Technology.

Coli form count in water samples is the commonly-used bacterial indicator of water pollution by faecal contamination. In 2002, the United States National Committee on Social and

Cultural Rights recognized the following essential criteria for drinking water. The water should be,

- Sufficient
- Safe and acceptable
- Accessible
- Affordable for the people

The World Health Organization defines the term **reasonable access for the water** as the availability of at least 20 liters of water per person per day, from a source within one kilometer of the user's dwelling.

Usually conventional water treatment plants with distribution systems are available in most urban areas with constant availability of clean water. However, these large systems are not available in rural areas. Therefore, people in rural areas fulfill their water needs from poor water sources and they frequently encounter water shortages. In addition, drinking water quality is often substandard in rural areas since water treatment facilities are non-existent most of the time.

Water treatment process: During the process of raw water purification, water is subjected to three processes to make it safer for consumption. These processes are sedimentation, filtration and disinfection.

1. *Sedimentation* is a physical *water* treatment process, used to settle out suspended solids in *water* under the influence of gravity e.g. in natural reservoirs, large tanks etc. Household level water treatment by sedimentation could be accomplished using a small container as a pail. The sedimentation process could be accelerated through the use of coagulants and flocculants allowing particles to join together thereby increasing their weight.

2. Filtration
Filtration removes impurities from water by means of a fine physical barrier, a chemical process or a biological process. Particles and large pathogens like worms trapped in small spaces between the grains of filter media, adsorption where pathogens becomes attached to filter media and biologically microorganisms die naturally or consumed by microorganisms present in the filter media.

3. Disinfection
Destruction of harmful organisms through oxidation by adding chlorine or directly by radiation through Ultra Violet (UV) rays of sunlight or artificial UV rays, can remove many pathogenic microorganisms.

Household water treatment
In many parts of the world, households use different filtration methods such as ceramic, stone and sand filters in order to purify drinking water using the principles of sedimentation and filtration. There are advantages as well as disadvantages in these different types. The household filtration methods can be divided mainly into -

Rapid Sand Filter
Water is driven through a sand bed or porous ceramic filter either by gravity or pressure and particles are removed by entrapping. The construction cost of this type of filters is high and need regular backwashing for continuity of proper function. Pathogens which are smaller than the filter holes can easily escape entrapping.

Table 1: Vaccine-preventable Diseases & AFP

26th February 05th March 2010(09th 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					
Acute Flaccid Paralysis	00	01	00	00	00	00	00	00	00	01	01	19	11	+ 72.7 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	-
Measles	00	00	00	00	00	00	00	00	00	00	07	18	27	- 33.3 %
Tetanus	00	00	00	00	00	00	00	01 BD=1	00	01	00	06	06	0.0 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	02	03	16	- 81.2 %
Tuberculosis	125	05	01	14	04	23	00	11	23	206	209	1766	1436	+23.7 %

Table 2: Newly Introduced Notifiable Disease

26th February 05th March 2010(09th 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	17	08	09	10	04	04	01	10	02	65	334	667	1685	- 60.4 %
Meningitis	01 KT=1	01 KN=1	00	01 JF=1	03 BT=1 TR=2	03 PU=3	00	01 BD=1	05 RP=5	15	11	324	169	+ 91.7 %
Mumps	01	00	02	01	02	01	00	02	01	10	17	151	317	- 52.4 %
Leishmaniasis	00	00	08 MT=1 HB=7	00	00	00	02 AP=2	00	00	10	01	71	60	+ 18.3 %

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.

10th South East Asia Regional Scientific Meeting of the International Epidemiological Association

23rd - 26th May 2010

Colombo, Sri Lanka

Theme

"Epidemiological Methods in Evidence Based Healthcare"

Visit <http://www.episea2010.com>

Table 4: Selected notifiable diseases reported by Medical Officers of Health
26th February 05th March 2010(09th 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	92	1197	1	26	0	3	2	16	0	5	30	107	0	3	2	18	0	1	92
Gampaha	47	1216	1	7	0	6	2	10	0	2	5	93	0	1	0	19	0	0	60
Kalutara	21	263	2	34	0	4	1	5	10	16	5	40	0	0	1	10	0	0	75
Kandy	14	379	5	67	0	0	1	3	0	1	0	9	8	37	1	18	0	0	61
Matale	15	237	3	143	0	0	0	6	18	54	0	21	0	0	1	13	0	0	83
Nuwara	5	43	5	19	0	0	5	28	3	3	1	5	7	22	1	11	0	0	77
Galle	11	126	1	35	0	2	0	0	0	4	2	5	0	2	0	4	0	2	100
Hambant	21	198	0	9	0	2	0	1	1	1	1	19	3	34	0	2	0	0	91
Matara	13	93	3	25	0	1	0	1	0	34	16	56	3	47	2	7	0	0	88
Jaffna	47	1728	3	36	0	1	12	218	0	4	0	0	4	83	3	17	0	0	58
Kili-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mannar	0	49	0	11	0	0	0	18	0	0	0	0	0	0	0	8	0	0	100
Vavuniya	11	438	2	13	0	1	3	23	1	1	0	0	0	0	0	4	0	0	50
Mullaitivu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Batticaloa	14	617	1	24	0	1	0	5	0	9	0	1	0	1	0	0	0	0	62
Ampara	0	21	0	19	0	0	0	2	0	6	0	14	0	0	0	6	0	0	29
Trincomal	71	586	0	39	1	4	1	3	3	7	1	8	0	4	0	6	0	0	60
Kurunega	34	369	1	53	0	2	1	8	0	1	17	108	0	15	0	26	0	1	75
Puttalam	7	390	0	18	0	3	0	23	0	114	20	44	0	0	0	1	0	0	67
Anuradha	21	561	0	16	0	0	0	2	0	0	2	12	0	9	2	12	0	4	74
Polonnar	2	77	0	17	0	1	0	0	0	2	1	25	0	0	0	13	0	0	71
Badulla	4	143	2	39	0	0	2	27	0	6	0	14	0	15	1	13	0	0	60
Monaraga	14	95	2	47	0	0	2	16	0	1	2	12	1	13	0	1	0	0	73
Ratnapur	55	264	6	69	0	3	0	4	0	8	3	65	0	21	0	33	0	1	56
Kegalle	13	230	0	13	0	4	0	14	0	2	5	48	0	4	0	26	0	0	55
Kalmunai	17	340	3	36	0	0	1	4	0	0	0	0	0	0	0	7	0	1	62
SRI LANKA	549	9660	41	815	01	38	33	437	36	281	111	706	26	311	14	275	00	10	69

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 05th March, 2010 Total number of reporting units =311. Number of reporting units data provided for the current week: 205

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).

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.

ON STATE SERVICE

Dr. P. PALIHAWADANA
CHEIF EPIDEMIOLOGIST
EPIDEMIOLOGY UNIT
231, DE SARAM PLACE
COLOMBO 10