WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
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Vol. 37 No.41 09th – 15th October 2010

WER SRI LANKA - 2010

ELECTROMAGNETIC FIELDS AND PUBLIC HEALTH

THE PRESENT EVIDENCE

Sri Lankan community usually well adapts to new technologies very soon. The recent example is the use of mobile phone. During late eighties and early nineties a mobile phone was to be a very luxurious item used by a very few people. Within the last twenty years the scenario has completely changed and today schooling children also possess mobile phones.

Anyone can purchase a working mobile phone for around 2000 Sri Lankan Rupees but with no quality assurance of the product. Telecommunication Regulatory Commission (TRC) of Sri Lanka recently has taken steps to initiate necessary regulatory action to prevent low quality mobile phones which may be harmful to human health, entering the market.

Following account describes the current stand of World Health organization regarding the Electromagnatic Fields.

Electromagnetic fields (EMF) occur in nature and thus have always been present on earth. However, during the twentieth century, environmental exposure to man-made sources of EMF steadily increased due to electricity demand, ever advancing wireless technologies and changes in work practices and social behaviour. Everyone is exposed to a complex mix of electric and magnetic fields at many different frequencies, at home and at work.

Potential health effects of manmade EMF have been a topic of scientific interest since the late 1800s,and have received particular attention during the last 30 years.EMF can be broadly divided into static and low-frequency electric and magnetic fields, where the common sources include power lines, household electrical appliances and computers, and high frequency or radiofrequency fields, for which the main sources are radar, radio and television broadcast facilities, mobile telephones and their base stations, induction heaters and anti-theft devices.

Unlike ionizing radiation (such as gamma rays given off by radioactive materials, cosmic rays and X-rays) found in the upper part of the electromagnetic spectrum, EMF are much too weak to break the bonds that hold molecules in cells together and, therefore, cannot produce ionization. This is why EMF are called 'non-ionizing radiations' (NIR).

WHAT HAPPENS WHEN YOU ARE EXPOSED TO ELECTROMAGNETIC FIELDS?

Electrical currents exist naturally in the human body and are an essential part of normal bodily functions. All nerves relay their signals by transmitting electric impulses. Most biochemical reactions, from those associated with digestion to those involved in brain activity, involve electrical processes.

The effects of external exposure to EMF on the human body and its cells depend mainly on the EMF frequency and magnitude or strength. The frequency simply describes the number of oscillations or cycles per second.
At low frequencies, EMF passes through the

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body while at radiofrequencies the fields are partially absorbed and penetrate only a short depth into the tissue. Low-frequency electric fields influence the distribution of electric charges at the surface of conducting tissues and cause electric current to flow in the body. Low-frequency magnetic fields induce circulating currents within the human body. The strength of these induced currents depends on the intensity of the outside magnetic field and the size of the loop through which the current flows. When sufficiently large, these currents can cause stimulation of nerves and muscles.

At radiofrequencies (RF), the fields only penetrate a short distance into the body. The energy of these fields is absorbed and transformed into the movement of molecules. Friction between rapidly moving molecules
results in a temperature rise. This effect is used in domestic applications such as warming up food in microwave ovens, and in many industrial applications such as plastic welding or metal heating. The levels of RF fields to which people are normally exposed in our living environment are much lower than those needed to produce significant heating.

BIOLOGICAL EFFECTS AND HEALTH EFFECTS

Biological effects are measurable responses of organisms or cells to a stimulus or to a change in the environment. Such responses, e.g. increased heart rate after drinking coffee or falling asleep in a stuffy room, are not necessarily harmful to health. Reacting to changes in the environment is a normal part of life. However, the body might not possess adequate compensation mechanisms to mitigate all environmental changes or stresses. Prolonged environmental exposure, even if minor, may constitute a health hazard if it results in stress. In humans, an adverse health effect results from a biological effect that causes detectable impairment in the health or well-being of exposed individuals.

Complying with exposure limits recommended in national and international guidelines helps to control risks from exposures to EMFs that may be harmful to human health. The present debate is centered on whether long-term, low level exposure below the exposure limits can cause adverse health effects or influence well-being of the people.

CONCLUSIONS FROM SCIENTIFIC RESEARCH

LOW-FREQUENCY FIELDS

Scientific knowledge about the health effects of EMF is substantial and is based on a large number of epidemiological, animal and in-vitro studies. Many health outcomes ranging from reproductive defects to cardiovascular
and neurodegenerative diseases have been examined, but the most consistent evidence to date concerns childhood leukemia. In 2001, an expert scientific working group of WHO's International Agency for Research on Cancer (IARC) reviewed studies related to the carcinogenicity of static and extremely low frequency (ELF) electric and magnetic fields. Using the standard IARC classification that weighs human, animal and laboratory evidence, ELF magnetic fields were classified as possibly carcinogenic to humans based on epidemiological studies of childhood leukaemia. An example of a well-known agent classified in the same category is coffee, which may increase risk of kidney cancer, while at the same time be
protective against bowel cancer. "Possibly carcinogenic to humans" is a classification used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence for carcinogenicity in experimental animals. Evidence for all other cancers in children and adults, as well as other types of exposures (i.e. static fields and ELF electric fields) was considered inadequate to classify either due to
insufficient or inconsistent scientific information. While the classification of ELF magnetic fields as possibly carcinogenic to humans has been made by IARC, it remains possible that there are other explanations for the observed association between exposure to ELF magnetic fields and childhood leukaemia.

HIGH-FREQUENCY FIELDS

Concerning radiofrequency fields, the balance of evidence to date suggests that exposure to low level RF fields (such as those emitted by mobile phones and their base stations) does not cause adverse health effects. Some scientists have reported minor effects of mobile phone use, including changes in brain activity, reaction times, and sleep patterns. In so far as these effects have been confirmed, they appear to lie within the normal bounds of human variation.

Presently, research efforts are concentrated on whether long-term, low level RF exposure, even at levels too low to cause significant temperature elevation, can cause adverse health effects. Several recent epidemiological studies of mobile phone users found no convincing evidence of increased brain cancer risk. However, the technology is too recent to rule out possible long-term effects. Mobile phone handsets and base stations present quite different exposure situations. RF exposure is far higher for mobile phone users than for those living near cellular base stations. Apart from infrequent signals used to maintain links with nearby base stations, handsets transmit RF energy only while a call is being made. However, base stations are continuously transmitting signals, although the levels to which the public are exposed are extremely minimal, even if they live nearby.

Given the widespread use of technology, the degree of scientific uncertainty, and the levels of public apprehension, rigorous scientific studies and clear communication with the public are needed.

Source : World Health Organization.

Table 1: Vaccine-preventable Diseases & AFP

02th – 08th October 2010(40th 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	00	00	00	00	00	00	00	00	00	00	66	57	+ 15.8 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	-
Measles	03	01	00	00	00	00	00	00	00	04	00	81	148	- 45.3 %
Tetanus	00	00	00	00	00	00	00	00	00	00	00	18	21	- 14.3 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	02	27	54	- 52.6 %
Tuberculosis	128	17	11	14	18	13	44	16	58	319	129	7799	7958	-02.0 %

Table 2: Newly Introduced Notifiable Disease

02th – 08th October 2010(40th 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	15	04	08	01	04	08	06	07	09	62	66	2696	13414	- 79.9 %
Meningitis	01 CB=1	00 ML=1	00 MT=1	00	01 AM=1	04 KN=3 PU=1	02 AP=1 PO=1	01 BD=1	00	09	38	1308	975	+ 39.5 %
Mumps	04	00	05	00	01	02	01	00	01	14	22	929	1492	- 34.1 %
Leishmaniasis	00	00	02 HB=1 MT=1	00	00	01 KG=1	05 AP=5	00	00	08	07	286	560	- 48.9 %

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.

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.

Dengue Prevention and Control Health Messages

Reduce, Reuse or Recycle the plastic and polythene collected in your home and help to minimize dengue mosquito breeding.

Table 4: Selected notifiable diseases reported by Medical Officers of Health

02nd – 08th October 2010(40st Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns received timely
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	%
Colombo	51	5505	5	264	0	14	4	129	0	38	9	478	0	7	0	55	0	1	**69**
Gampaha	18	3680	2	136	0	25	1	43	0	20	19	383	0	14	0	94	0	4	**80**
Kalutara	12	1729	3	208	0	13	2	28	0	74	14	331	0	3	3	34	1	2	**83**
Kandy	19	1534	15	276	0	4	2	29	0	14	3	97	1	122	6	124	0	1	**91**
Matale	2	564	2	275	0	6	1	34	0	72	2	90	0	6	0	49	0	1	**100**
Nuwara	8	209	3	315	0	0	1	108	0	84	0	24	1	57	3	41	0	0	**85**
Galle	11	1056	1	229	0	7	1	6	0	17	11	102	0	19	1	15	0	4	**84**
Hambanto	6	767	0	66	0	7	0	4	0	13	0	82	1	82	0	15	0	0	**100**
Matara	1	560	2	156	0	8	0	11	0	49	3	302	4	123	0	17	0	0	**88**
Jaffna	2	2701	9	240	0	4	11	499	0	8	0	1	0	112	0	61	0	2	**75**
Kilinochc	1	40	0	14	0	0	0	10	0	1	0	3	0	0	0	1	0	0	**75**
Mannar	5	535	1	43	0	2	1	42	0	10	0	0	0	1	1	17	0	0	**50**
Vavuniya	1	571	0	44	0	3	0	42	0	11	0	2	0	1	0	12	0	1	**100**
Mullaitivu	0	21	0	6	0	0	0	3	0	0	0	0	0	2	0	1	0	0	**17**
Batticaloa	2	1181	4	158	0	4	0	34	0	36	0	12	0	3	0	5	0	3	**93**
Ampara	0	144	3	90	0	1	0	8	0	65	0	30	0	1	0	11	0	0	**57**
Trincomal	2	941	2	138	0	14	0	7	0	11	1	21	0	18	0	14	0	1	**73**
Kurunegal	15	1347	4	264	0	19	3	39	0	15	6	269	0	52	6	110	0	4	**90**
Puttalam	3	946	3	129	0	7	0	49	0	124	3	70	0	1	0	21	0	1	**67**
Anuradha	8	1005	6	81	0	11	1	13	4	43	2	75	0	25	0	44	0	4	**74**
Polonnaru	3	381	4	94	0	1	0	6	0	8	2	58	0	2	0	42	0	0	**100**
Badulla	9	1242	3	177	0	1	2	80	0	27	2	73	3	93	8	100	0	0	**93**
Monaragal	12	966	1	153	0	1	1	35	0	7	0	32	0	73	1	78	0	3	**64**
Ratnapura	21	2654	1	429	0	5	0	17	0	26	7	351	0	56	1	89	0	2	**67**
Kegalle	9	851	0	126	0	15	0	57	1	22	20	260	2	25	5	104	0	0	**64**
Kalmunai	3	509	7	264	0	3	0	8	0	9	0	3	0	0	0	11	0	1	**62**
SRI LANKA	**219**	**31639**	**81**	**4375**	**00**	**175**	**31**	**1341**	**05**	**804**	**104**	**3149**	**12**	**898**	**35**	**1165**	**01**	**35**	**79**

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 08th October , 2010 Total number of reporting units =311. Number of reporting units data provided for the current week: 256
A = Cases reported during the current week. B = Cumulative cases for the year.

PRINTING OF THIS PUBLICATION IS FUNDED BY THE WORLD HEALTH ORGANIZATION (WHO).

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

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