WEEKLY EPIDEMIOLOGICAL REPORT

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Cellular Phones and Cancer Risk

Background

There are three main reasons why people are concerned that cellular phones might have the potential to cause certain types of cancer or other health problems:

- Cellular phones emit radiofrequency energy (radio waves), a form of non-ionizing radiation. Tissues nearest to the phone can absorb this energy.
- Globally, the number of cell phone subscriptions is around 5 billion.
- Over time, the number of cellular phone calls per day, the length of each call and the amount of time people use cell phones have increased. Cellular phone technology has also undergone substantial changes.

Radiofrequency energy is a form of electromagnetic radiation. Electromagnetic radiation can be categorized into two types: ionizing (e.g., x-rays, radon, and cosmic rays) and non-ionizing (e.g., radiofrequency and extremely low-frequency or power frequency).

Exposure to ionizing radiation, such as from radiation therapy, is known to increase the risk of cancer. However, although many studies have examined the potential health effects of non-ionizing radiation from radar, microwave ovens, and other sources, there is currently no consistent evidence that non-ionizing radiation increases cancer risk.

The only known biological effect of radiofrequency energy is heating. The ability of microwave ovens to heat food is one example of this effect of radiofrequency energy. Radiofrequency exposure from cell phone use does cause heating; however, it is not sufficient to measurably increase body temperature.

The International Agency for Research on Cancer (IARC), a component of the World Health Organization, has recently classified radiofrequency fields as "possibly carcinogenic to humans," based on limited evidence from human studies, limited evidence from studies of radiofrequency energy and cancer in rodents and weak mechanistic evidence (from studies of genotoxicity, effects on immune system function, gene and protein expression, cell signaling, oxidative stress, and apoptosis, along with studies of the possible effects of radiofrequency energy on the blood-brain barrier).

The American Cancer Society (ACS) states that the IARC classification means that there could be some risk associated with cancer, but the evidence is not strong enough to be considered causal and needs to be investigated further. Individuals who are concerned about radiofrequency exposure can limit their exposure, including using an ear piece and limiting cell phone use, particularly among children.

The U.S. Center for Disease Control and Prevention (CDC) states that, although some studies have raised concerns about the possible risks of cell phone use, scientific research as a whole does not support a statistically significant association between cell phone use and health effects.

Key Points

- *Cell phones emit radiofrequency energy, a form of non-ionizing electromagnetic radiation, which can be absorbed by tissues closest to where the phone is held.*
- *The amount of radiofrequency energy a cell phone user is exposed to depends on the technology of the phone, the distance between the phone's antenna and the user, the extent and type of use and the user's distance from cell phone towers.*
- *Studies thus far have not shown a consistent link between cell phone use and cancers of the brain, nerves or other tissues of the head or neck. More research is needed because cell phone technology and how people use cell phones have been changing rapidly.*

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Measurement of radiofrequency energy exposure

Levels of radiofrequency exposure are indirectly estimated using information from interviews or questionnaires. These measures include the following:

- How "regularly" the respondent use cell phones (the minimum number of calls per week or month)
- The age and the year when the respondent first used a cell phone and the age and the year of last use (allows calculation of the duration of use and time since the start of use)
- The average number of cell phone calls per day, week, or month (frequency)
- The average length of a typical cell phone call
- The total hours of lifetime use, calculated from the length of typical call times, the frequency of use, and the duration of use

Cellular phone use and cancer risk-Study findings

A limited number of studies have shown some evidence of statistical association of cell phone use and brain tumor risks, but most studies have found no association. Reasons for these discrepancies include the following:

Recall bias,
which may happen when a study collects data about prior habits and exposures using questionnaires administered after disease has been diagnosed in some of the study participants. It is possible that study participants who have brain tumors may remember their cell phone use differently than individuals without brain tumors. Many epidemiologic studies of cell phone use and brain cancer risk lack verifiable data about the total amount of cell phone use over time.

Inaccurate reporting,
which may happen when people say that something has happened more or less often than it actually did. People may not remember how much they used cell phones in a given time period.

Morbidity and mortality,
studies among people with brain cancer. Gliomas are particularly difficult to study, for example, because of their high death rate and the short survival of people who develop these tumors. Patients who survive initial treatment are often handicapped, which may affect their responses to questions. Furthermore, for people who have died, next-of-kin are often less familiar with the cell phone use patterns of their deceased family member and may not accurately describe their patterns of use to an interviewer.

Participation bias,
which can happen when people who are diagnosed with brain tumors are more likely than healthy people (known as controls) to enroll in a research study. Also, controls that did not or rarely used cellular phones were less likely to participate in studies than controls who used cellular phones regularly.

Changing technology and methods of use.
Older studies evaluated radiofrequency energy exposure from analog cellular phones. However, most cellular phones today use digital technology, which operates at a different frequency and a lower power level than analog phones and cellular technology continues to change. Texting, for example, has become a popular way of using a cellular phone to communicate that does not require bringing the phone close to the head. Furthermore, the use of hands-free technology, such as wired and wireless headsets, is increasing and may decrease radiofrequency energy exposure to the head and brain.

Current Studies

A large prospective cohort study of cell phone use and its possible long-term health effects was launched in Europe in March 2010. This study, known as COSMOS , will enroll approximately 250,000 cell phone users aged 18 or older and will follow them for 20 to 30 years.
Participants in COSMOS will complete a questionnaire about their health, lifestyle, and current and past cell phone use. This information will be supplemented with information from health records and cell phone records.

Another case-control study, called Mobi-Kids , is under way to examine health effects among children.

Although recall bias is minimized in studies that link to cell phone records to exposure, such studies face other problems. For example, it is impossible to know who is using the listed cell phone or whether that individual also places calls using other cell phones. To a lesser extent, it is not clear whether multiple users of a single phone will be represented on a single bill.

The National Institute of Environmental Health Sciences of the United states (NIEHS), is carrying out a study of risks related to exposure to radiofrequency energy (the type used in cellular phones) in highly specialized labs that can specify and control sources of radiation and measure their effects on rodents.

The effect of cellular phone use in children

In theory, children have the potential to be at greater risk than adults for developing brain cancer from cell phones. Their nervous systems are still developing and therefore more vulnerable to factors that may cause cancer. Their heads are smaller than those of adults and therefore have a greater proportional exposure to the field of radiofrequency radiation that is emitted by cell phones. And children have the potential of accumulating more years of cell phone exposure than adults do.

So far, the data from clinical studies in children do not support this theory. The first published analysis came from a large case-control study called CEFALO, which was conducted in Denmark, Sweden, Norway, and Switzerland. The study included children who were diagnosed with brain tumors between 2004 and 2008, when their ages ranged from 7 to 19. Researchers did not find an association between cell phone use and brain tumor risk in this group of children. However, they noted that their results did not rule out the possibility of a slight increase in brain cancer risk among children who use cell phones, and that data gathered through prospective studies and objective measurements, rather than participant surveys and recollections, will be the key in clarifying whether there is an increased risk.

How to reduce exposure to radiation from cellular phones

- Reserve the use of cell phones for shorter conversations or for times when a landline phone is not available.
- Use a hands-free device, which places more distance between the phone and the head of the user.

Source

Cell Phones and Cancer Risk by National Cancer Institute, USA, available from http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones

Compiled by Dr. Madhava Gunasekera of the Epidemiology Unit

Table 1: Vaccine-preventable Diseases & AFP

17th – 23th November 2012 (47thWeek)

Disease	No. of Cases by Province									Number of cases during current week in 2012	Number of cases during same week in 2011	Total number of cases to date in 2012	Total number of cases to date in 2011	Difference between the number of cases to date in 2012 & 2011
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	00	00	00	01	00	00	00	00	01	02	71	78	- 09.0 %
Diphtheria	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Measles	00	00	00	00	00	01	00	00	00	01	06	61	122	- 50.0 %
Tetanus	00	00	00	00	00	00	00	00	00	00	00	12	24	- 50.0 %
Whooping Cough	01	00	00	00	00	00	00	00	00	01	01	95	50	+ 90.0 %
Tuberculosis	05	44	01	14	12	07	06	04	01	94	193	7912	8515	- 07.1 %

Table 2: Newly Introduced Notifiable Disease

17th – 23th November 2012 (47thWeek)

Disease	No. of Cases by Province									Number of cases during current week in 2012	Number of cases during same week in 2011	Total number of cases to date in 2012	Total number of cases to date in 2011	Difference between the number of cases to date in 2012 & 2011
	W	C	S	N	E	NW	NC	U	Sab					
Chickenpox	02	01	10	01	03	07	12	03	08	47	48	4072	3784	+ 05.3 %
Meningitis	02 CB=2 KL=1	00	01 GL=1	02 JF=2	00	02 KN=2	02 AP=2	00	00	10	06	757	774	- 07.6 %
Mumps	06	02	04	05	03	07	00	02	03	33	57	4114	2923	+ 40.7 %
Leishmaniasis	00	00	03 HB=2 MT=1	03 VU=3	00	01 KN=1	18 AP=16 PO=2	00	00	25	18	1079	730	+ 47.8 %

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

17th – 23th November 2012 (47thWeek)

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	51	8583	0	133	0	8	2	205	0	46	5	181	0	6	0	105	0	5	**8**
Gampaha	88	7261	2	86	0	16	1	59	0	44	10	295	1	23	3	308	0	0	**73**
Kalutara	22	2602	2	104	0	5	1	51	0	28	4	264	0	4	0	34	0	2	**62**
Kandy	42	2301	4	122	0	4	0	25	2	58	3	77	1	116	11	129	0	0	**91**
Matale	3	510	4	96	0	5	0	12	5	54	1	42	0	3	0	34	0	0	**58**
Nuwara	5	320	0	178	0	3	0	27	0	9	3	36	0	63	2	20	0	1	**69**
Galle	20	1440	6	125	0	6	0	18	0	17	2	126	3	72	0	4	0	0	**79**
Hambantota	13	560	2	43	0	3	1	10	0	31	5	80	1	55	2	25	0	0	**75**
Matara	30	1719	21	107	0	8	0	19	0	31	6	190	2	80	0	137	0	0	**100**
Jaffna	28	611	8	224	0	14	11	344	1	83	1	3	4	261	0	18	0	1	**83**
Kilinochchi	0	85	0	46	0	2	0	34	0	45	0	4	0	31	0	4	0	1	**0**
Mannar	6	150	2	79	0	4	0	59	0	17	0	26	1	43	0	2	0	0	**60**
Vavuniya	1	90	3	43	0	21	0	13	0	22	0	18	0	3	0	1	0	1	**100**
Mullaitivu	0	25	4	30	0	1	0	14	0	3	0	3	0	5	0	1	0	0	**60**
Batticaloa	12	611	4	273	0	4	0	16	0	307	0	9	0	0	0	9	0	4	**86**
Ampara	1	142	1	90	0	3	0	6	0	13	0	27	0	0	0	3	0	0	**57**
Trincomalee	2	145	9	229	0	2	0	16	0	15	1	40	0	18	0	4	0	0	**58**
Kurunegala	72	2790	3	203	0	17	1	97	0	41	4	145	0	33	2	132	0	4	**81**
Puttalam	46	1465	2	99	0	9	0	12	0	12	0	40	0	16	0	6	0	2	**83**
Anuradhapu	7	365	2	89	0	7	0	13	2	23	2	84	0	24	1	60	0	1	**74**
Polonnaruw	2	238	0	74	0	2	0	4	0	122	1	49	0	3	0	42	0	1	**43**
Badulla	10	357	2	122	0	4	0	51	0	6	0	36	0	116	0	44	0	0	**59**
Monaragala	3	258	34	148	0	6	0	26	0	9	4	68	4	85	0	172	0	2	**73**
Ratnapura	42	3724	11	272	0	25	0	50	2	14	4	291	0	40	1	123	0	3	**72**
Kegalle	31	2498	2	59	0	9	0	26	0	19	8	178	0	62	5	558	0	0	**82**
Kalmune	5	220	2	270	0	2	0	8	1	91	0	9	0	1	0	10	0	3	**46**
SRI LANKA	**542**	**39120**	**130**	**3344**	**00**	**190**	**17**	**1215**	**13**	**1160**	**64**	**2321**	**17**	**1163**	**27**	**1985**	**00**	**31**	**70**

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 23rd November , 2012 Total number of reporting units 329. Number of reporting units data provided for the current week: 235
A = Cases reported during the current week. **B** = Cumulative cases for the year.

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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.**

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