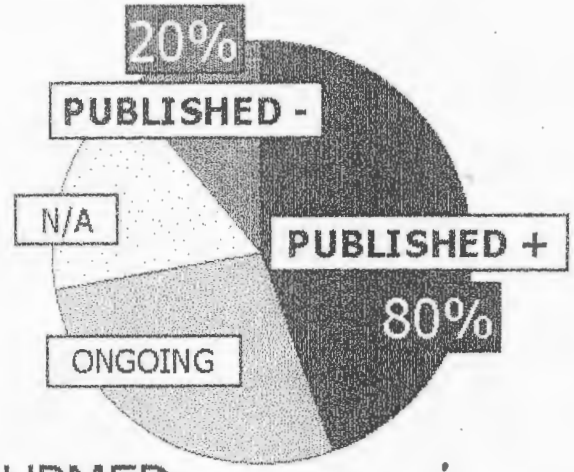
# W.H.O. EMF Database

- Epidemiologicals studies on mobile phone base stations
  - 5 studies papers referenced on WHO
    - Santini 2003 : Microwave Syndrome / 300 m
    - Navarro 2003 : Microwave Syndrome
    - Wolf 2004 : Cancer risk x 4
    - Eger 2004 : Cancer risk x 3
    - Siegriest 2005 : Psychological factors
  - 3 reports non available
  - 5 studies ongoing




- To this should be added 5 studies available on PUBMED
  - Bortkiewicz 2004 : Microwave Syndrome
  - Hutter 2004 : Absence of psychological factors
  - Hutter 2006 : Risk as from 0,1 Volt/meter
  - Abdel-Rassoul 2006 : Neuro-behavioural complaints
  - Schuz 2006 : DECT base station / no risk of glioma

(4) go to other side of green clip

Cancer

# Mobile Telecommunications and Health

## Review of the Current Scientific Research In view of Precautionary Health Protection

Final Draft
Translated by
Andrea Klein
+44 20 88832194

April 2000
ECOLOG-Institut

## 7. Health Risks to Humans Resulting from Exposure to The Electromagnetic Fields of Mobile Telecommunications

The triggering of an illness caused by an (environmental) pollutant and the development of this illness are a multi phased process, which begins with a biological, biochemical or biophysical primary interaction of the pollutant with the biological system and ends with the manifestation of the illness. During the different phases of the process, the body's own repair mechanisms can intervene and impede the further development of the illness. An assessment of the potential health risks of electromagnetic fields as they are used for mobile telecommunications should therefore be mainly based on studies conducted directly on humans, because extrapolations from animal studies or even in vitro studies on cell cultures only have limited validity for effects in humans, due to the difference in susceptibilities and the lack of organic interactions in cell cultures. However, due to the ethical limits to the research on humans, it is unavoidable to use results from experiments with animals, single organs or cells in order to discover the biological and physiological mechanisms.

### Cancer

Given the results of the present epidemiological studies, it can be concluded that electromagnetic fields with frequencies in the mobile telecommunications range do play a role in the development of cancer. This is particularly notable for tumors of the central nervous system, for which there is the only epidemiological study so far, examining the actual use of mobile phones. The most striking result of this study was an obvious correlation between the side at which the phone was used and the side at which the tumor occurred. The brain tumor incidence however was only slightly increased. A (hypothetical) explanation of such a finding could for example be that mobile fields have a promoting effect on previously initiated (multiple) tumors, triggering a defence mechanism in the body which is capable of suppressing unpromoted tumors.

Higher risks were also demonstrated for several forms of leukaemia.

Although the studies in relation to testicular cancer were examining particular exposure conditions (emitting equipment worn partly on the body at hip level), given the high risk factor found, a possible risk cannot be excluded, especially not for mobile users wearing the devices in stand by mode on their belts. The epidemiological findings for testicular cancer also need to be interpreted in conjunction with the results of the studies of fertility problems occurring in relation to high frequency electromagnetic fields.

The risk factors for cancers other than testicular cancer are only moderately increased, but not negligible considering this technology will potentially reach full coverage of the entire population. Reliable conclusions about a possible dose-response-relationship cannot be made on the basis of the present results of epidemiological studies, but an increase of cancer risk cannot be excluded even at power flux densities as low as 0.1 $W/m^2$.

In long term animal experiments, the carcinogenic effect of pulse modulated high frequency fields was demonstrated for power flux densities of circa 3$W/m^2$ (mouse, exposure duration 18 months, 30 minutes per day, SAR (mouse) circa 0.01 W/kg).

On the cellular level, a multitude of studies found the type of damage from high frequency electromagnetic fields which is important for cancer initiation and cancer promotion:

Direct damage on the DNA as well as influences on the DNA synthesis and DNA repair mechanisms were demonstrated in *in vivo* and *in vitro* experiments for continuous and pulsed fields at power flux densities from 10$W/m^2$ and 9$W/m^2$ respectively.

# Radiofrequente elektromagnetische velden (300 Hz - 300 GHz)

# Radiofrequency electromagnetic fields (300 Hz - 300 GHz)

(within TETRA) range

embryo development
produce 'hot spots' inside body (deep)
effects eyes
K + Na, Ca, Cl,
reduced foetal mass
infants / elderly / sick
metallic implants
pacemakers etc.
induced currents in body

Gezondheidsraad: Commissie Radiofrequente straling
Health Council of the Netherlands: Radiofrequency Radiation Committee

Gezondheidsraad

1997/01

of power density or SAR resulting in measurable effects. All data pertain to animal studies, unless specified otherwise.

### 2.6.1 *General comments*

Most research dealing with effects of EM fields has been performed in the MHz and GHz range. Relatively few investigations have been carried out in the kHz range. For example, the WHO report on EM fields lists only 6 experiments in the kHz range *versus* approximately 200 in the MHz and GHz range (WHO93).

In general, the experimental data indicate that the effects of EM fields occur at lower power densities when the object is exposed to pulsed EM fields compared with exposure to continuous fields. When available, the Committee reports thresholds for pulsed or continuous EM fields separately. If no differentiation is made, only data on effects due to continuous EM fields were available.

The literature on biological effects of radiofrequency carrier waves that are amplitude-modulated at extremely low frequencies is reported separately in section 2.6.5.

### 2.6.2 *Effects at the cellular level*

#### DNA damage

The data suggest that the only exposures that are potentially mutagenic are those at high power densities, which result in a substantial increase in temperature. When temperatures remain within physiological limits, neither acute nor long-term exposure results in an increase in chromosome aberration frequency (WHO93).

Recent reports suggest that low level, acute exposure to radiofrequency EM fields may increase single and double DNA strand breaks in brain cells (Lai95, Lai96). However, given the weight of evidence against a direct effect of EM fields on DNA and the fact that these studies appear to carry some experimental flaws, the experiments need to be replicated before they can be used in assessing health risks (ICN96).

#### Carcinogenesis

Results of cancer-related studies are contradictory and in most cases difficult to interpret. Long-term exposure to continuous wave EM fields at 2450 MHz, leading to SARs of 2-3 W/kg, has been reported to enhance the development of chemically induced tumors in mice (Szm82, Szm88). However, several shortcomings in these studies, such as the use of inadequate control groups, preclude drawing firm conclusions (WHO93).

See conclusions p 26

# New Medical Evidence on Electromagnetic Fields and Health is Alarming:

# Do not Expose Local People to Mobile Phone Base Stations

by

**Dr. D.A. Eklund**

**BSc MBCHB MFPHM**

**April 1998**

## CONCLUSIONS

A WHO spokesman stated earlier this year, that studies of populations with residential exposure from point sources such as mobile phone base stations, have caused widespread health concerns, even though RF exposures are very low. He suggested that recent studies which may indicate an increased risk of cancer in exposed populations should be investigated further.

This paper has outlined some of the many recent medical and scientific publications on the topic, together with some of the related professional and public disputes. There is serious concern about the associations of low-intensity RF with childhood leukaemia and brain cancer, and a wide variety of other adverse health effects are likely. Mobile phone technology is relatively new and the medical evidence is only now emerging. Meanwhile, prudent avoidance is being recommended to separate populations from EMF sources such as mobile phone base stations, by at least five kilometres.

Members' attention is drawn to the dilemma that a young family with a history of leukaemia has in a house on the brow of the hill, within about 200 metres of the base station proposed by Orange Communications. As seen in this paper, early evidence is emerging that EMF towers, and mobile phone frequencies specifically, may not only be associated with such cancers, but may promote their development.

The Planning Subcommittee of Waverley Borough Council is urged to consider fully the evidence in this paper, and support local residents in maintaining their health, the safety of their homes and peace of mind, by rejecting all Orange applications for a mobile phone base station on Chinthurst Hill.

(4) For References ×20 STudies





www.next-up.org

# SCIENTIFIC ARGUMENTS TO PROVE IMMEDIATE APPLICATION OF PRECAUTIONARY PRINCIPLE MEASURES AGAINST MOBIL PHONE.

By

**Roger SANTINI**

Doctor ès-sciences
Member of Bioelectromagnetics Society (USA)

## INTRODUCTION

Millions of people are using mobile cell phones and hundreds of thousands of base stations antennas generate microwaves (ultra high frequencies) pulsed in low frequencies to make those phones work. Even though official studies say there is no danger in this new technology, the following text presents scientific arguments, which are in opposition and emphasize its harmfulness to health.

N.B. Some of the scientific arguments brought-up in this text have been presented in a paper at the 26th international meeting of Bio electromagnetic Society in Washington D.C.
(R. Santini. The reason for applying the precautionary principle against mobile phone base stations – Abstract book. 2004. Pages 293-294).

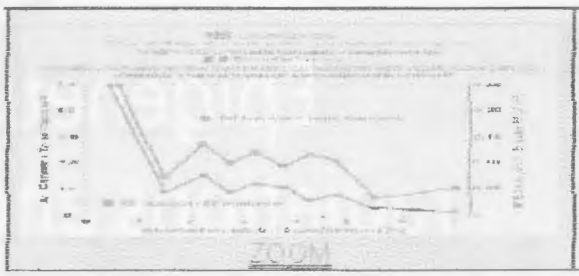
Many factors are likely to influence the exposure level to pulsed microwaves near to base station sitings and particularly:

- distance to transmitting sources;
- whether you are located within or outside the main beam emitting from ultra-high frequency
- transmitters"
- the presence of passive relay transmitters made of metallic structures (outside shutters of windows, garage doors, flight of stairs), which can magnify the density of microwaves electrical field at the measuring point (INERIS report, December 2003, p. 22);
- fluctuation of power transmitted by base stations due to the quantity of phones communicating and processed by those;
- presence of other magnetic sources in the environment;
- Operators modifications of antennas quantity and characteristics of a base station
- (R. Santini. Les téléphones cellulaires et leur station relais : Risques pour la santé ? La Presse médicale. 1999 – 28 : 1884 – 18886 – R. Santini et coll. Danger des téléphones cellulaires et de leurs stations relais. Pathol. Biologie. 2000. 48 : 525-528).

In the same way, the phone users' exposure level is likely to change with :

- length of communication;
- the use, or not, of head phone kit keeping the phone antenna away from the head;
- the user's age (children's greater sensitivity due to higher pulsed microwaves penetration);
- technical characteristics of the used device, …
- Phone used in poor transmission conditions in basements, in raining conditions, in fog, …
- (R. Santini et Coll. Electric fields from 900 MHz digital cellular telephones.
- Bio electromagnetic´s . 20th meeting. Florida. Abstract book. 1998. Pages 95-96).

Sci



- Dr Neil Cherry Scientific study
"Probable health effects associated with mobile base stations in communities: the need for health studies"
- Étude scientifique Dr Neil Cherry
"Effets sur la santé probables associées à des stations de bases téléphone mobile mobiles chez les résidents riverains : la nécessité d'études sur la santé" [UK]

www.next-up.org/Newsoftheworld/CaseCaseEnvEval.php www.ijoeh.com/index.php/ijoeh/article/view/1302/0

-International Journal of Occupational and Environmental Health,
Vol 16, No 3 (2010)

# Epidemiological Evidence for a Health Risk from Mobile Phone Base Stations

*Vini G. Khurana, Lennart Hardell, Joris Everaert, Alicja Bortkiewicz, Michael Carlberg, Mikko Ahonen*

**Abstract**

Human populations are increasingly exposed to microwave/RadioFrequency (RF) emissions from wireless communication technology, including mobile phones and their base stations.
By searching PubMed, we identified a total of 10 epidemiological studies that assessed for putative health effects of mobile phone base stations. Seven of these studies explored the association between base station proximity and neurobehavioral effects and three investigated cancer.
We found that eight of the 10 studies reported increased prevalence of adverse eurobehavioral symptoms or cancer in populations living at distances < 500 meters from base stations.
None of the studies reported exposure above accepted international guidelines, suggesting that current guidelines may be inadequate in protecting the health of human populations.
We believe that comprehensive epidemiological studies of longterm mobile phone base station exposure are urgently required to more definitively understand its health impact.

Key words: base stations; electromagnetic field (EMF); epidemiology; health effects; mobile phone; radiofrequency (RF); electromagnetic radiation

-International Journal of Occupational and Environmental Health,
Vol 16, No 3 (2010)

# Preuve épidémiologique d'un risque pour la Santé près des stations de bases de téléphonie mobile

*Vini G. Khurana, Lennart Hardell, Joris Everaert, Alicja Bortkiewicz, Michael Carlberg, Mikko Ahonen*

**Résumé**

La population humaine est de plus en plus exposée aux RadioFréquences (RF) micro-ondes provenant des technologies des communications du sans fil, y compris les téléphones mobiles et les antennes relais de leurs stations de bases.
En effectuant des recherches dans PubMed, *(ndlr : Publication scientifique Gouvernementale US)* nous avons identifié un total de 10 études épidémiologiques qui évaluent les effets sanitaires putatifs *(ndlr : estimés)* des stations de bases de téléphonie mobile.
Sept de ces études ont exploré l'association entre la proximité des stations de base et les neuro-effets et trois enquêtes ont investigué sur la co-promotion avec les cancers.
Nous avons constaté que huit des 10 études ont signalé une augmentation de la prévalence des symptômes délétères ou neurologique promoteurs de cancers chez les populations vivant à des distances de moins de 500 mètres des stations de base d'antennes relais.
Aucune de ces études scientifiques n'a signalé une exposition en-dessus des normes directrices internationales en vigueur, ce qui suggère que les directives actuelles peuvent être déclarées insuffisantes pour la protection de la santé des populations humaines.
Nous croyons que des études épidémiologiques approfondies sur le long terme sur l'exposition *(ndlr l'irradiation)* des populations résidantes à proximité des stations de bases de téléphonie mobile est d'urgence nécessaire pour mieux comprendre définitivement leurs impacts sur la santé.

Mots clés: stations de base; champs électromagnétique (CEM), épidémiologie, effets sur la santé; téléphones mobile; radiofréquence (RF); rayonnement électromagnétique.

Cancer x3 variou countries x4 SCI



Scientists for a GM Free Europe - ISIS/Green Network/TWN International Briefing at the European Parliament, Brussels 12th June 2007. For more information, click here

ISIS Press Release 24/05/07

# Cancer Risks from Microwaves Confirmed

*Microwaves from wireless mobile phone transmitters may be more potent than lower frequency electromagnetic fields in promoting cancer* Dr. Mae-Wan Ho

A fully referenced version of this article is posted on ISIS members' website. Details here

An electronic version of this report, or any other ISIS report, with full references, can be sent to you via e-mail for a donation of £3.50. Please e-mail the title of the report to: report@i-sis.org.uk

Evidence linking weak electromagnetic radiation (EMR) to leukaemia and other cancers has been fast accumulating in recent years [1-3] ( Electromagnetic Fields Double Leukemia Risks , Mobile Phones & Cancer , *SiS* 18; Electromagnetic Fields, Leukaemia and DNA Damage , *SiS* 24). Such 'non-thermal' effects of EMR – due to levels well below that sufficient to bring about any heating - have been observed even before World War II [4] ( Non-Thermal Effects , *SiS* 17).

During the cold war period, a four-fold excess of cancer cases was diagnosed among the staff of the American Embassy in Moscow that had been secretly irradiated with microwaves at well below the threshold set in current guidelines. The US State Department study on this episode was described in a paper published in 1997 [5]. This was among the earliest evidence for non-thermal effects of microwaves, and many studies are now confirming the high cancer risks of people exposed to microwaves from mobile phone base stations and transmitters around the world. Microwaves are no different from EMRs in the lower frequency range in that respect; except that microwaves may be even more potent in promoting cancer and other illnesses [6] ( Drowning in a Sea of Microwaves, the Wi-Fi Revolution , *SiS* 34).

## Ten year study in a German city found cancer risk

Available online at www.sciencedirect.com
ScienceDirect
NeuroToxicology
ELSEVIER
NeuroToxicology xxx (2006) xxx–xxx

# Neurobehavioral effects among inhabitants around mobile phone base stations

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Received 20 October 2005; accepted 18 July 2006

**Abstract**

*Background:* There is a general concern on the possible hazardous health effects of exposure to radiofrequency electromagnetic radiations (RFR) emitted from mobile phone base station antennas on the human nervous system.
*Aim:* To identify the possible neurobehavioral deficits among inhabitants living nearby mobile phone base stations.
*Methods:* A cross-sectional study was conducted on (85) inhabitants living nearby the first mobile phone station antenna in Menoufiya governorate, Egypt, 37 are living in a building under the station antenna while 48 opposite the station. A control group (80) participants were matched with the exposed for age, sex, occupation and educational level. All participants completed a structured questionnaire containing: personal, educational and medical histories; general and neurological examinations; neurobehavioral test battery (NBTB) [involving tests for visuomotor speed, problem solving, attention and memory]; in addition to Eysenck personality questionnaire (EPQ).
*Results:* The prevalence of neuropsychiatric complaints as headache (23.5%), memory changes (28.2%), dizziness (18.8%), tremors (9.4%), depressive symptoms (21.7%), and sleep disturbance (23.5%) were significantly higher among exposed inhabitants than controls: (10%), (5%), (5%), (0%), (8.8%) and (10%), respectively ($P < 0.05$). The NBTB indicated that the exposed inhabitants exhibited a significantly lower performance than controls in one of the tests of attention and short-term auditory memory [Paced Auditory Serial Addition Test (PASAT)]. Also, the inhabitants opposite the station exhibited a lower performance in the problem solving test (block design) than those under the station. All inhabitants exhibited a better performance in the two tests of visuomotor speed (Digit symbol and Trailmaking B) and one test of attention (Trailmaking A) than controls. The last available measures of RFR emitted from the first mobile phone base station antennas in Menoufiya governorate were less than the allowable standard level.
*Conclusions and recommendations:* Inhabitants living nearby mobile phone base stations are at risk for developing neuropsychiatric problems and some changes in the performance of neurobehavioral functions either by facilitation or inhibition. So, revision of standard guidelines for public exposure to RER from mobile phone base station antennas and using of NBTB for regular assessment and early detection of biological effects among inhabitants around the stations are recommended.


*Keywords:* Neurobehavioral effects; Mobile phone base stations; Radiofrequency radiations (RFR)

## 1. Introduction

There is a general concern about the possible hazardous health effects of exposure to radiofrequency radiations (RFR) emitted from mobile phone base station antennas. Disturbance of the nervous system leads to behavioral changes and may serve as an early indicator of disturbances in regulatory functions of many systems (Lai and Singh, 1994). Exposure of the neural tissue to RFR can cause electrophysiological changes in the nervous system (Navakatikian and Tomashevskaya, 1994; Velizarov et al., 1999). Some studies have suggested that RFR induce tissue heating leads to tissue damage (Gajsek et al., 2002; Preece et al., 1999). Some effects are observed among mobile phone users at low intensity and after repeated exposure (Hyland, 2000). The efflux of calcium ions from brain tissue is an important neurochemical effect of RFR as calcium ion plays an important role in the functions of the nervous system such as the release of neurotransmitters (Dutta et al., 1989). Experimental studies on

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0161-813X/$ – see front matter © 2006 Elsevier Inc. All rights reserved.
doi:10.1016/j.neuro.2006.07.012

(H) page # 3 8 types of Cancer ~ x H fold

# *INCREASED INCIDENCE OF CANCER NEAR A CELL-PHONE TRANSMITTER STATION.*

**RONNI WOLF MD[1]**

**DANNY WOLF MD[2]**

**From:**

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**The Pediatric Outpatient Clinic, Hasharon Region, Kupat Holim, ISRAEL.**

**Running title: Cancer near a cell-phone transmitter station.**

**Word count: Words = 1649, Characters = 8414.**

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**Fax 972-9-9560978. E-mail: wolf_r@netvision.net.il**

International Journal of Cancer Prevention

VOLUME 1, NUMBER 2, APRIL 2004

Increased Incidence of Cancer near a Cell-Phone Transmitter Station
**by Ronni Wolf and Danny Wolf**

The study indicates an association between increased incidence of cancer and living in proximity to a cell-phone transmitter station.

**Key Words:**

Radiofrequency radiation; Cell-phone transmitter station (cell-phone antenna); Cancer incidence study; Netanya.

© Med Sci Monit, 2004; 10(7): CR336-340
**PMID:** 15232509

MEDSCIMONIT
Clinical Research

**Received:** 2003.11.05
**Accepted:** 2004.01.07
**Published:** 2004.07.02

**Authors' Contribution:**
A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

# Malignant melanoma of the skin – not a sunshine story!

**Örjan Hallberg**[ABCDEFG], **Olle Johansson**[ABCDEFG]

Experimental Dermatology Unit, Department of Neuroscience, Karolinska Institute, Stockholm, Sweden

**Source of support:** Karolinska Institute, the Cancer and Allergy Foundation, SIF, TCO Development.

## Summary

**Background:** In an earlier study on malignant melanoma incidence in Sweden, Norway, Denmark and the USA, we found a strong association between the introduction of FM radio broadcasting at full-body resonant frequencies and increasing melanoma incidence. The purpose of the current study was to review mortality and incidence data for malignant melanoma of the skin in Sweden and its temporal relation to increased "sun-traveling", and to the introduction of FM and TV broadcasting networks.

**Material/Methods:** Official, published information was collected and displayed graphically. These data included incidence rates of malignant melanoma, death numbers, charter travel statistics, and data on the expansion of the FM broadcasting network in all counties of Sweden.

**Results:** A good correlation in time was found for the rollout of FM/TV broadcasting networks while the increased amount of "sun travel" by air (charter) did not start until 7 years after the melanoma trend break in 1955. Counties that did not roll out their FM-broadcasting network until several years after 1955 continued to have a stable melanoma mortality during the intervening years.

**Conclusions:** The increased incidence and mortality of melanoma of skin cannot solely be explained by increased exposure to UV-radiation from the sun. We conclude that continuous disturbance of cell repair mechanisms by body-resonant electromagnetic fields seems to amplify the carcinogenic effects resulting from cell damage caused e.g. by UV-radiation.

**key words:** **melanoma • skin • UV • sun • radio • TV • broadcasting**

**Full-text PDF:** http://www.MedSciMonit.com/pub/vol_10/no_7/4321.pdf

**Word count:** 2482
**Tables:** –
**Figures:** 6
**References:** 20

**Author's address:** Örjan Hallberg, Polkavägen 14B, 142 65 Trångsund, Sweden, e-mail: oerjan.hallberg@swipnet.se

Reprinted from. *Journal of Australian College of Nutritional & Environmental Medicine* Vol. 21 No. 1; April 2002: pages 3-8

# Cancer Trends During the 20th Century

**Örjan Hallberg,**[a] M.Sc. e.e., consultant and
**Olle Johansson,**[a] Assoc. Professor

## Abstract

**Purpose**: To review development trends and possible relations between different cancers in Sweden and in other countries to better understand causing mechanisms.

**Materials and methods**: We used publicly available databases on cancer incidence and mortality to highlight trends and trend breaks. The data were used for correlation studies between different forms of cancers as reported from different counties within Sweden, and from other countries.

**Results**: Some cancer forms correlate to malignant melanoma while others, like leukaemia, do not relate to melanoma at all. Asthma is a disease that has a sharp trend break just as these cancers show around 1955.

**Conclusions**: There is a common environmental stress that accelerates several cancer forms such, as colon cancer, lung cancer, breast cancer, bladder cancer and malignant melanoma. Every effort should be taken to identify and eliminate this stress.

## Introduction

There are a number of cancers that still are lacking good explanations as to their cause. The cancer report from *Socialstyrelsen* 1997[1] states that the causing mechanisms behind bladder-, breast-, colon- and prostate cancers still are unknown. Considerable doubt rests also with the popular explanation that sunburn is causing the drastic increased incidence in skin melanoma and death rates since 1955. Another problem that has not been solved is why we see such an explosive increase of asthma and allergies from about the same time.

In this paper, we will take a closer look at the statistics of all these diseases in an attempt to narrow down the range of possible causing mechanisms.

## Methods

We used databases on cancer incidence and mortality for Sweden as well as for other countries to derive cancer trends over time.[1-3] We also combined results from a death-cause register and a cancer incidence register in Sweden to investigate if people who died from lung cancer or breast cancer had earlier in life suffered from skin melanoma.[4] Correlation characteristics were calculated between different cancer types, both within Sweden and between different countries.

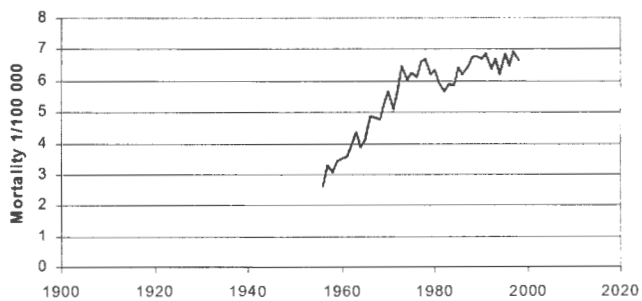



**Figure 1.** Mortality due to bladder cancer in Sweden since 1956.

## Results

### *Bladder, prostate, melanoma, colon and breast cancers*

Figure 1 shows the development of bladder cancer since 1955. In 1979 this disease had a reduction in the numbers dying annually, but since 1982 the rate is increasing again. Due to lack of data we can only see the development from 1955.

Figure 2 gives the drastic increase in Sweden in prostate cancer since 1951. Increasing trends can be noticed in 1955, 1970 and 1982, while a period of decreasing numbers started in 1979, just as for bladder cancer.

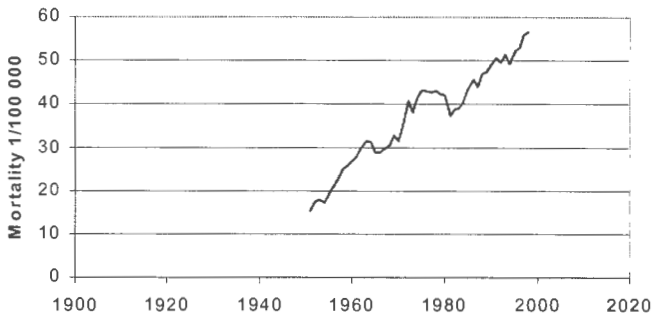



**Figure 2.** Development of prostate cancer death rates in Sweden since 1951.

Figure 3 shows the mortality for skin melanoma in Sweden. Data before 1955 is not published by the authorities, but was retrieved from a library.[5] The raw data shows that the 'natural' death rate increased from about 30 per year in 1912 to 50 in 1954. This gives an increase of 0.5 more victims per year. From 1955 it increased to 325 in 1996, which gives an increase by almost 7 victims per year, i.e. 14 times more than before 1955.

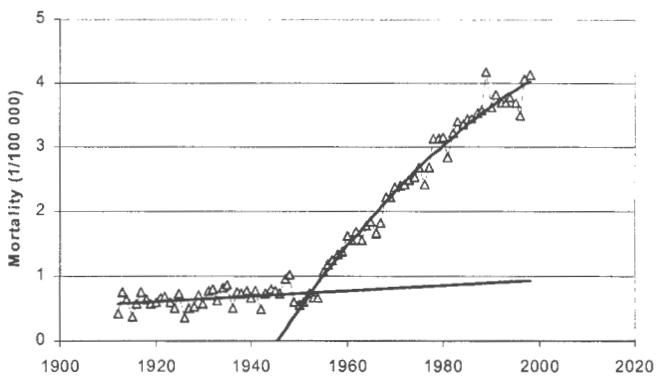



**Figure 3.** Skin melanoma mortality in Sweden since 1912.

Figure 4 gives the development of lung cancer death rate in Sweden.

Figure 5 gives the development of female breast cancer deaths in Sweden. Breast cancer screening started after 1975 to be gradually introduced in the country, which might explain part of the stabilisation. Better treatment in general is also altering these types of graphs. It should be noticed that breast cancer incidence has not levelled off, but continues to increase. This means that the causing mechanism behind breast cancer has not been properly addressed, but only methods of treatment and early diagnostics.

(4) Estonia.

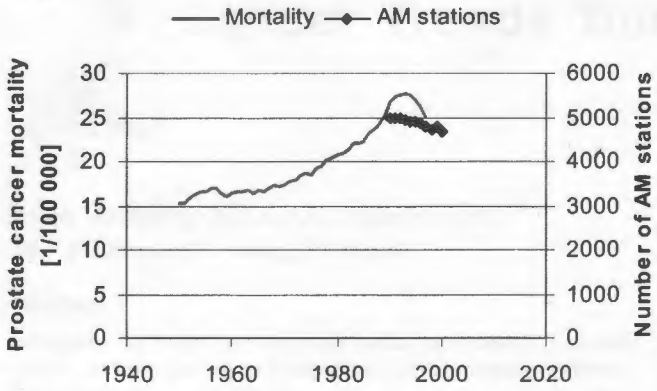
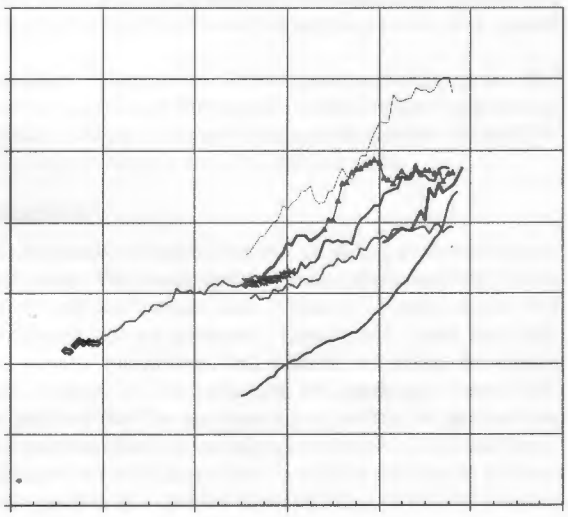



**Figure 25.** A sharp decline in number of men killed by prostate cancer has been noticed in USA since 1990. At the same time the number of AM stations have started to decline.



Australian Environ. Medicine. Vol. 21 No.1 p3-8. Ap. 2002.

← 1, Go to ONE

2. Figure 18 indicates that leukaemia has nothing to do with melanoma. Somewhat more unexpected is the strong relation between melanoma and colon cancer and between lung cancer and bladder cancer.
3. Since the cancer mortality trend-breaks coincide with expansion or disruption of public broadcasting in Sweden, studies regarding the influence from electromagnetic fields on cancer and asthma development cannot be further delayed.
4. Lung cancer mortality has a multiple correlation to both cigarette consumption and skin melanoma mortality.
5. Since closing down of public radio transmitters seems to have a strong effect in reducing cancer mortality, public air radio transmission should be avoided.
6. Age-standardised ratios should be used with care when presenting cancer rates that are dependent on exposure times.

Similar trend-breaks as found in Sweden can be noticed for other countries. Figure 26 shows, for example, that Estonia (EE) had a steep increase in the cancer mortality in 1991, the year that the 'western' FM radio-frequencies were allowed and introduced all over the country.

* * base stations




←GO BACK ONE

# Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations

H-P Hutter, H Moshammer, P Wallner and M Kundi

*Occup. Environ. Med.* 2006;63;307-313
doi:10.1136/oem.2005.020784

10 yrs. study 12 (4)

# The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer

Horst Eger, Klaus Uwe Hagen, Birgitt Lucas, Peter Vogel, Helmut Voit

Published in *Umwelt·Medizin·Gesellschaft* 17,4 2004, as:
**'Einfluss der räumlichen Nähe von Mobilfunksendeanlagen auf die Krebsinzidenz'**

**Summary**

Following the call by Wolfram König, President of the Bundesamt für Strahlenschutz (Federal Agency for radiation protection), to all doctors of medicine to collaborate actively in the assessment of the risk posed by cellular radiation, the aim of our study was to examine whether people living close to cellular transmitter antennas were exposed to a heightened risk of taking ill with malignant tumors.

The basis of the data used for the survey were PC files of the case histories of patients between the years 1994 and 2004. While adhering to data protection, the personal data of almost 1,000 patients were evaluated for this study, which was completed without any external financial support. It is intended to continue the project in the form of a register.

The result of the study shows that the proportion of newly developing cancer cases was significantly higher among those patients who had lived during the past ten years at a distance of up to 400 metres from the cellular transmitter site, which has been in operation since 1993, compared to those patients living further away, and that the patients fell ill on average 8 years earlier.

In the years 1999-2004, *ie* after five years' operation of the transmitting installation, the relative risk of getting cancer had trebled for the residents of the area in the proximity of the installation compared to the inhabitants of Naila outside the area.

Key words: cellular radiation, cellular transmitter antennas, malignant tumours

**The rapid increase in the use of mobile telephony in the last few years has led to an increasing number of cell phone transmission masts being positioned in or near to residential areas. With this in mind, the president of the German governmental department for protection against electromagnetic radiation (Bundesamtes für Strahlenschutz) Wolfram König, has challenged all doctors to actively help in the work to estimate the risks from such cell phone masts. The goal of this investigation was therefore to prove whether on not people living near to cell phone masts have a higher risk of developing cancerous tumours.**

**The basic data was taken from the medical records held by the local medical authority (Krankenkasse) for the years 1994 to 2004. This material is stored on computer. In this voluntary study the records of roughly 1,000 patients from Naila (Oberfranken) were used, respecting the associated data protection laws. The results from this study show a significantly increased likelihood of developing cancer for the patients that have lived within 400 metres of the cell phone transmission mast (active since 1993) over the last ten years, in comparison to those patients that live further away. In addition, the patients that live within 400 metres tend to develop the cancers at a younger age. For the years 1999 to 2004 (*ie* after five or more years of living with the cell phone transmission mast), the risk of developing cancer for those living within 400 metres of the mast in comparison to those living outside this area, was three times as high.**

## Introduction

A series of studies available before this investigation provided strong evidence of health risks and increased cancer risk associated with physical proximity to radio transmission masts. Haider *et al.* reported in 1993 in the Moosbrunn study frequent psychovegetive symptoms below the current safety limit for electromagnetic waves (1). In 1995, Abelin *et al.* in the Swiss- Schwarzenburg study found dose dependent sleep problems (5:1) and depression (4:1) at a shortwave transmitter station that has been in operation since 1939 (2).

In many studies an increased risk of developing leukaemia has been found; in children near transmitter antennas for Radio and Television in Hawaii (3); increased cancer cases and general mortality in the area of Radio and Television transmitter antennas in Australia (4); and in England, 9 times more leukaemia cases were diagnosed in people who live in a nearby

Cancers

# Blame a mobile phone antenna of 43 cases of cancer among 350 residents

## The 350 inhabitants of the farmstead Los Pérez, Velez-Malaga, have complained that the 43 cases, 35 have resulted in the death of their neighbors. They demand the withdrawal of the antenna, which has been supported by UPyD

EFE, MALAGA | UPDATED 24.11.2009 - 20:15



The neighbors of the Cortijo Los Perez in the municipality of Vélez-Málaga, today denounced the existence of 43 cases of cancer cases among the 350 residents of this neighborhood and blame the situation on a mobile phone antenna with living fifteen years.

Antonia Delgado, spokeswoman for the neighbors, said today at a press conference that the antenna is installed next to the old N-340, a few meters from their homes, the population center of Benajarafe.

Delgado noted that the 43 cancer cases, 35 have resulted in the deaths of the neighbors, "and so far this year, eight people have died."

He stated that his sister suffers from breast cancer, larynx one of his father and uncle, a melanoma.

Neighbors have complained repeatedly to the municipality of Vélez-Málaga antenna removal "and we only managed to tell us that someday will be removed, but that does not worth it because our family and neighbors still sick."

"I do not know how many dead need the City Council to remove the air," added Delgado, who said that neighbors are "disappointed" after the final meeting they had with the municipal authorities, which were shown reports of emissions that persuade them.

Another of those affected, Antonio d'Ivoire, which was diagnosed last April testicular tumor, said that the lane that gives access to the farmstead happens twenty feet from where the antenna is "and every time we go we get radiation" .

The neighbors claim has been backed by UPyD Velez-Malaga, whose members have demanded the withdrawal Consistory of the antenna, both for its potential health effects and because, by its location next to the watchtower of Benajarafe, "contravenes several laws concerning the protection of national heritage."

Municipal policy chief of UPyD, Javier Sansegundo, has reported that if the City does not transfer this equipment outside the village of Benajarafe, submit a complaint about the visual pollution suffered by the watchtower.

Two weeks ago, Councilman for New Technologies, Jesus Aranda (PSOE), calmed neighbors and said that the antenna met the emission levels set by law.

Pathol Biol 2002; 50 : 369-73

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(English translation)

# Study of the health of people living in the vicinity of mobile phone base stations: I. Influences of distance and sex *

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**Summary**

A survey study using a questionnaire was conducted on 530 people (270 men, 260 women) living or not in the vicinity of cellular phone base stations, on 18 Non Specific Health Symptoms. Comparisons of complaint frequencies (CHI-SQUARE test with Yates correction) in relation to the distance from base stations and sex show significant ($p$ <0.05) increase as compared to people living > 300 m or not exposed to base stations, up through 300 m for tiredness, 200 m for headache, sleep disruption, discomfort, etc., 100 m for irritability, depression, loss of memory, dizziness, libido decrease, etc. Women significantly more often than men ($p$ < 0.05) complained of headache, nausea, loss of appetite, sleep disruption, depression, discomfort and visual disruptions. This first study on symptoms experienced by people living in the vicinity of base stations shows that, in view of radioprotection, the of minimal distance of people from cellular phone base stations should not be < 300 m. © 2002 Editions scientifiques et medicales Elsevier SAS

**base station / bioeffects / cellular phone**

## 1. INTRODUCTION

Chronic exposure to high frequency electromagnetic fields or microwaves brings on bioeffects in man such as headaches, fatigue, and sleep and memory disruptions [1, 2]. These biological effects, associated with others (skin problems, nausea, irritability, etc.) constitute what is known in English as "Non Specific Health Symptoms" (NSHS) that characterize radiofrequency sickness. [3] Cellular mobile phone technology uses hyperfrequencies (frequencies of 900 or 1800 MHz) pulsed with extremely low frequencies (frequencies < 300 Hertz) [4]. Even though the biological effects resulting from mobile phone use are relatively well known and bring to mind those described in radiofrequency sickness [5, 6], to our knowledge no study exists on the health of people living in the vicinity of mobile phone base stations.

We are reporting here the results pertaining to 530 people living in France, in the vicinity or not, of base stations, in relation to the distances from these stations and to the sex of the study participants.

## 2. MATERIALS AND METHODS

### 2.1. Questionnaire employed:

A questionnaire similar to that developed for the study on mobile phone users [6] was sent to people wishing to participate in the study. General questions pertained to age, sex, estimated distance from base stations (less than 10 m, 10 to 50 m, 50 to 100 m, 100 to 200 m, 200 to 300 m, more than 300 m) and their location in relation to the antennas (facing, beside, behind, beneath in the case of antennas placed on rooftops). The exposure conditions were defined by the length of time living in the neighborhood of base stations, (less than 1 year through more than 5 years), the number of days per week and the number of hours per day ( less than I hour through 16-24 hours per day).

Participants were asked to indicate the presence or not of electrical transformers (at less that 10 m), high or very high tension electric power lines (at less that 100 m) and radio and television transmitters (at less than 4 km). The questionnaire also sought information on computer use (more than 2 hours per day) and portable telephone use (more than 20 minutes per day).

The level of complaints for the studied symptoms was expressed by the study participants using a scale of: 0 = never, 1 = sometimes, 2 = often, 3 = very often. Of 570 questionnaires received, 40 were not used due to lack of information on the distance from the base stations or on the level of the complaints experienced. For the 530 questionnaires studied, 270 came from males (average age + or - variation: 45 years + or - 20) and 260 from females (47 years + or - 19). 18 symptoms referenced in the "NSHS" were the subject of the questionnaire, one of which, premature menopause, concerned only females.

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* The results presented in this study do not involve INSA in Lyon. INSA is the French National Institute of Applied Sciences.

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Cancer

# Radio, TV towers linked to increased risk of melanoma

By Örjan Hallberg, MSEE - Dec 9, 2007
*Published in* www.foodconsumer.org

**People living near many radio and TV stations are at a higher risk of melanoma, a deadly skin cancer that is diagnosed in an increasing number of people worldwide, particularly in the Western countries, according to my studies and those by others.**

**My studies have found that those who had four FM-radio or TV towers covering their residential area are more than twice as likely as those who had one.**

The possible association between melanoma and exposure to the radio waves from FM-radio and TV stations got my attention in 1998 when I read a graph published by a local newspaper, showing that the rate had been increasing ever since 1960 and still has not seemed to level off to date.

The news story explained that the increased risk is due to increased exposure to UV-radiation from the sun, since we travel abroad more often than ever, increasing our exposure to sun rays, which are believed to be the main risk factor for skin cancer.

But the explanation was not convincing enough to me. Do we really stay 10-20 times longer in the sun now than we did before 1960, when the incidence of melanoma was much lower? Also, how do you explain the fact that melanoma is often found on part of the skin that is not often exposed to sun rays?

I am skilled at quality management and problem solving in telecommunication electronics, and I consider myself knowledgeable and competent in my profession. I believe I am well qualified to do research on the issue, and I decided to get an answer for these questions by myself.

The first thing I needed to decide was when the rate of melanoma began rising. I looked back at the data on melanoma incidence for all 289 communes in Sweden and noticed that the incidence of melanoma was near zero in 1955. Afterwards, the rate of melanoma had been increasing. Only from 1955 on did the whole country gradually become covered by FM-radio and TV towers. Everybody eventually was exposed within a 10-year period.

My first attempt to establish an association between melanoma incidence and FM-radio and TV stations was to plot a graph of the incidence versus the power density. To my surprise, the association was not significant, if there was any, as shown in Figure 1.

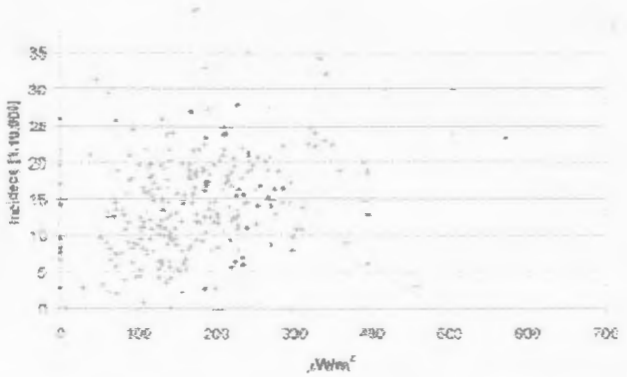


*Figure 1. The rate of melanoma in 289 Swedish communes is poorly correlated with the power density from surrounding FM broadcasting main towers.*

Two weeks afterwards, I came up with another idea, thinking that the incidence of melanoma may be linked to the number of FM-radio and TV stations in a residential area. I plotted the graph and I indeed found a significant correlation between incidence of melanoma and the number of radio and TV towers covering a residential area, as shown in Figure 2.

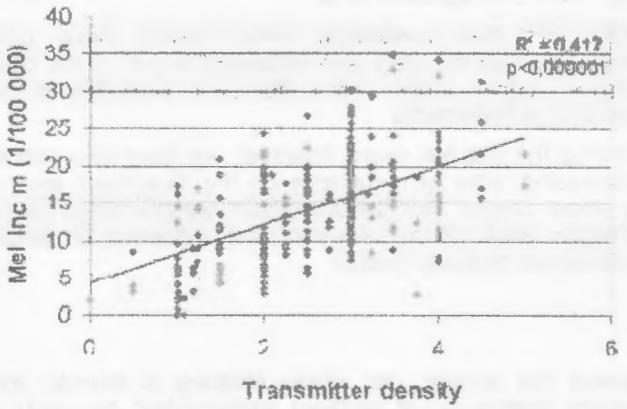


*Figure 2. The melanoma rates in the 289 Swedish communes correlate very well with the number of surrounding FM broadcasting main transmitters.*

From this graph, we can see that the baseline for melanoma incidence (without any radio or TV station in a residential area) is about 4.5 people in every 100,000. When the number of radio and TV stations is increased to 1.5, the incidence increases to 10 people in every 100,000. When the number of radio and TV stations is increased to 4, the risk of melanoma increases by 100 percent compared to the area with 1.5 radio and TV stations. (Editor's note: 20 people in every 100.000).

One interesting observation is that the association between radio and TV towers and incidence of melanoma depends upon age. For children ages 13 to 15 and younger, the exposure to radio waves does not seem to increase risk of melanoma. Does that mean melanoma may have a long incubation period, causing the effect of radio waves to not manifest in children? Or is it simply that the taller adults are at a higher risk of melanoma when exposed to the radio waves? I can't answer these questions.

However, I do know that the radio frequencies used by radio and TV stations make a difference. In Western countries, the FM broadcasting is transmitted in the 87-107 MHz band. The half wave length at 87 MHz is 1.74 meter. At this wavelength, you might end up catching a standing wave, shaking the center of your body for the whole night if your bed is facing an FM broadcasting tower!

Japan never used the 87-108 MHz band for their FM radio broadcasting. Their melanoma rate is just 3% of what we have in Sweden! And when Japanese people move to the USA, their melanoma rates start to increase.

My first paper on the association between melanoma incidence and the number of surrounding FM towers, which was co-authored by Associate professor Olle Johansson at the Karolinska Institute in Stockholm, was published in the spring of 2002 in a peer-reviewed medical journal, Archives of Environmental Health.

# Study of leukaemia and lymphoma mortality near Vatican radio transmitter

## English Summary of:

TRIBUNALE PENALE DI ROMA UFFICIO DEL GIUDICE PER LE INDAGINI PRELIMINARI DOTTSSA ZAIRA SECCHI (396 Pages)

**PROCEDIMENTO PENALE N. 33642/03**
**PERIZIA MEDIANTE INDAGINI EPIDEMIOLOGICA**
**INCIDENTE PROBATORIO**

Milano 25 giugno 2010
Perizia a cura di
Dott ANDREA MICHELI

This is a report of a study of mortality from leukaemia and lymphoma in adults and children in relation to proximity to two radio transmitters: the structures at Radio Vaticana and at MariTele, near Rome (see page 12 of the Report for the exact locations).

**Conclusions:**

1. **Adult mortality near Radio Vaticana (pages 44 – 59)**

   (i) For those exposed for at least 10 years between 5 and 9 km from the antennae in both women and men of all ages, the mortality risk from leukaemia and lymphoma combined, adjusted for age, gender, smoking, occupation, and proximity to the MariTele antennae was significant, OR = 3.12, 95% CI = 1.00 – 9.69.

   (ii) For those exposed for at least 10 years between 5 and 9 km from the antennae in women only of all ages, the mortality risk from leukaemia and lymphoma combined, adjusted for age, gender, smoking, occupation and proximity to the MariTele antennae was significant, OR = 4.79, 95% CI = 1.04 – 21.91.

   (iii) For those exposed for at least 10 years between 5 and 9 km from the antennae in both women and men over age 21, the mortality risk from leukaemia and lymphoma combined, adjusted for age, gender, smoking, occupation and proximity to the MariTele antennae was significant, OR = 3.44, 95% CI = 1.05 – 11.27.

   (iv) For those exposed for at least 10 years between 6 and 12 km from the antennae in both women and men of all ages, the mortality risk from the analysis of pathology relating only to leukaemia, adjusted for age, gender,

smoking, occupation and proximity to the MariTele antennae was significant, OR = 6.69, 95% CI = 1.45 – 30.78. This is based on relatively small numbers, but the finding suggests that the mortality risk related only to those with leukaemia.

(v) In all the analyses conducted, excess risk was detected up to 12 lm from the antennae, but there was a lack of evidence of risk for exposed adults living <5 km from the antennae (details in the body of the report)

**Overall, the findings indicate a statistically significant association between exposure to the Radio Vaticana antennae and mortality from leukaemia in adults.**

2. **Antennae structure at MariTele (pages 73 – 86)**

In contrast to the above findings for Radio Vaticana, the evidence did not support an association between leukaemia or lymphoma mortality and proximity to the antennae structure at MariTele. However, the possibility of risk cannot be excluded.

3. **Childhood leukaemia and lymphoma (ages 0 – 14)**

(i) For children who had lived most of their lives between 6 and 12 km of the antennae at Radio Vaticana, the risk (OR) for leukaemia and lymphoma, adjusted for age, gender and distance from powerlines was significant, OR = 5.19; 95% CI = 1.54 – 17.54, while adjusting for age, gender, distance from powerlines and from the MariTele antennae was significant OR = 4.63, 95% CI = 1.28 – 16.78.

(ii) For children who had lived most of their lives between 6 and 12 km of the antennae at Radio Vaticana and also within 6 km of the antennae at MariTele, the risk (OR) for leukaemia and lymphoma, adjusted for age, gender an distance from powerlines was significant, OR = 5.19; 95% CI = 1.54 – 17.54, while adjusting for age, gender and distance from powerlines was significant, OR = 3.85, 95% CI = 1.21 – 12.26.

(iii) The risk was also evident in the sub-group of cases over one year of age.

(iv) The risk was associated with the pathology for leukaemia and lymphoma.

**Overall, the evidence suggests an excess risk of leukaemia and lymphoma in children in relation to proximity to both the Radio Vaticana and the MariTele transmitters.**

Sci

27 July 2010

# Cancer Mortality near Air Force Bases.

Lester, J.R. and D.F. Moore. 1982. Cancer Mortality and Air Force Bases. Journal of Bioelectricity 1(1): 72-82. <http://www.magdahavas.com/wordpress/wp-content/uploads/2010/07/Lester-1982.pdf>

**Abstract**:

Nationally, counties with an Air Force Base were found to have significantly higher incidences of cancer mortality during 1950-1969 compared to counties without an Air Force Base.

**RESULTS**

This study is based on 92 active Air Force bases that were in operation during 1950-1969 in the United States. The authors hypothesize that the chronic low intensity microwave exposure to peak pulse patterns, characteristic of radar, could influence immunocompetence and account for the high cancer mortality near air bases. They cite a 1979 study by Meecham and Shaw that documents a 20% higher mortality rate for residents within 2 to 3 miles of the Los Angeles International Airport compared to a neighborhood 8 to 9 miles away. In addition to cancers a higher incidence of birth defects and nervous breakdowns, among residents who live near airports, was reported in Japan and Great Britain.

**COMMENTS**

This study brings to mind, PAVE PAWS, the US Air Force Radar Base that was installed in 1979 and was the focus of several cancer cluster studies in Cape Code, including an elevated rate of Ewing's Sarcoma (a malignant tumor often found in bone with a peak occurrence between 10 and 20 years of age). According to the National Academies' National Research Council report in 2005 and the Massachusetts Department of Health report in 2007 the radiation was unlikely to have played a primary role in the incidence of the various cancers and health effects.

However, based on Air Force measurements <http://airforcemedicine.afms.mil/idc/groups/public/documents/afms/ctb_042703.pdf> outside the security fence, values for average and maximum power density (attachment 4) are well above the Russian guidelines of 10 microW/cm2 with "corrected average" values ranging from 10 to 230 microW/cm2.

continued at . . . www.magdahavas.com <http://www.magdahavas.com>

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Pathophysiology 16 (2009) 113–122

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# Epidemiological evidence for an association between use of wireless phones and tumor diseases

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Received 7 November 2008; accepted 30 January 2009

**Abstract**

During recent years there has been increasing public concern on potential cancer risks from microwave emissions from wireless phones. We evaluated the scientific evidence for long-term mobile phone use and the association with certain tumors in case–control studies, mostly from the Hardell group in Sweden and the Interphone study group. Regarding brain tumors the meta-analysis yielded for glioma odds ratio (OR) = 1.0, 95% confidence interval (CI) = 0.9–1.1. OR increased to 1.3, 95% CI = 1.1–1.6 with 10 year latency period, with highest risk for ipsilateral exposure (same side as the tumor localisation), OR = 1.9, 95% CI = 1.4–2.4, lower for contralateral exposure (opposite side) OR = 1.2, 95% CI = 0.9–1.7. Regarding acoustic neuroma OR = 1.0, 95% CI = 0.8–1.1 was calculated increasing to OR = 1.3, 95% CI = 0.97–1.9 with 10 year latency period. For ipsilateral exposure OR = 1.6, 95% CI = 1.1–2.4, and for contralateral exposure OR = 1.2, 95% CI = 0.8–1.9 were found. Regarding meningioma no consistent pattern of an increased risk was found. Concerning age, highest risk was found in the age group <20 years at time of first use of wireless phones in the studies from the Hardell group. For salivary gland tumors, non-Hodgkin lymphoma and testicular cancer no consistent pattern of an association with use of wireless phones was found. One study on uveal melanoma yielded for probable/certain mobile phone use OR = 4.2, 95% CI = 1.2–14.5. One study on intratemporal facial nerve tumor was not possible to evaluate due to methodological shortcomings. In summary our review yielded a consistent pattern of an increased risk for glioma and acoustic neuroma after >10 year mobile phone use. We conclude that current standard for exposure to microwaves during mobile phone use is not safe for long-term exposure and needs to be revised.


*Keywords:* Brain tumors; Glioma; Acoustic neuroma; Meningioma; Cellular phones; Cordless phones

## 1. Introduction

During the last decade there has been a rapid development of wireless technology and along with that an increased use of wireless telephone communication in the world. Most persons use mobile phones and cordless phones. Additionally most populations are exposed to radiofrequency/microwave (RF) radiation emissions from wireless devices such as cellular antennas and towers, broadcast transmission towers, voice and data transmission for cell phones, pagers and personal digital assistants and other sources of RF radiation.

Concerns of health risks have been raised, primarily an increased risk for brain tumors, since the brain is the near field target organ for microwave exposure during mobile phone calls. Especially the ipsilateral brain (same side as the mobile phone has been used) is exposed, whereas the contralateral side (opposite side to the mobile phone) is much less exposed [1]. Thus, for risk analysis it is of vital importance to have information on the localisation of the tumor in the brain and which side of the head that has been predominantly used during phone calls.

Since Sweden was one of the first countries in the world to adopt this wireless technology a brief history is given in the following. First, analogue phones (NMT; Nordic Mobile Telephone System) were introduced on the market in the early 1980s using both 450 and 900 Megahertz (MHz) carrier waves. NMT 450 was used in Sweden since 1981 but closed down in December 31, 2007, whereas NMT 900 operated during 1986–2000.

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BRAIN





# ARTICLE IN PRESS

Available online at www.sciencedirect.com

Surgical Neurology xx (2009) xxx–xxx

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Technology

# Cell phones and brain tumors: a review including the long-term epidemiologic data ☆

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Received 23 December 2008; accepted 21 January 2009

**Abstract**

**Background:** The debate regarding the health effects of low-intensity electromagnetic radiation from sources such as power lines, base stations, and cell phones has recently been reignited. In the present review, the authors attempt to address the following question: is there epidemiologic evidence for an association between long-term cell phone usage and the risk of developing a brain tumor? Included with this meta-analysis of the long-term epidemiologic data are a brief overview of cell phone technology and discussion of laboratory data, biological mechanisms, and brain tumor incidence.

**Methods:** In order to be included in the present meta-analysis, studies were required to have met all of the following criteria: (i) publication in a peer-reviewed journal; (ii) inclusion of participants using cell phones for ≥10 years (ie, minimum 10-year "latency"); and (iii) incorporation of a "laterality" analysis of long-term users (ie, analysis of the side of the brain tumor relative to the side of the head preferred for cell phone usage). This is a meta-analysis incorporating all 11 long-term epidemiologic studies in this field.

**Results:** The results indicate that using a cell phone for ≥10 years approximately doubles the risk of being diagnosed with a brain tumor on the same ("ipsilateral") side of the head as that preferred for cell phone use. The data achieve statistical significance for glioma and acoustic neuroma but not for meningioma.

**Conclusion:** The authors conclude that there is adequate epidemiologic evidence to suggest a link between prolonged cell phone usage and the development of an ipsilateral brain tumor.


*Keywords:* Acoustic neuroma; Brain tumor; Cell phone; Electromagnetic radiation; Glioma; Incidence; Mechanism; Meningioma; Radiofrequency

*Abbreviations:* CBTRUS, Central Brain Tumor Registry of the United States; CDMA, code division multiple access; CI, confidence interval; CNS, central nervous system; EMF, electromagnetic field; EMR, electromagnetic radiation; FCC, Federal Communications Commission; GSM, global system for mobile communication; IARC, International Agency for Research on Cancer; MRI, magnetic resonance imaging; NHL, non-Hodgkin lymphoma; OR, odds ratio; SAR, specific absorption rate; TDMA, time division multiple access; WHO, World Health Organization.

* There is no author conflict of interest, and no funding was requested or received for this review. The conclusions expressed in this article do not necessarily reflect those of the authors' affiliated institutions and employers.

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## 1. Background

### 1.1. Cell phone technology

Cell phone technology incorporates base stations, namely, transmission tower antennae, and cell phone hand-held units. Cell phone networks were first deployed in Sweden in 1981 via the Nordic Mobile Telephone System (analogue; 450 MHz; first generation or "1G"). The digital system (GSM) started in 1991, representing the second generation of cell phone systems, or "2G." Mass deployment was present in most countries from the mid 1990s (Fig. 1). The latest system currently in mass deployment is based on adaptations of CDMA and TDMA (800 and 1900 MHz; "3G"). Radio waves emitted by modern GSM handsets have a peak power of 1 to 2 W, whereas other digital cellular technologies have power outputs of below 1 W, levels generally regarded as being safe by international regulatory authorities. The 3G has less than 0.25 W of peak power. Through "adaptive power control," the power generated by a cell phone can vary during a conversation according to the amount of interference with the signal, for example, due to the user being in a moving vehicle or within a building or elevator. The output power of the phone is generally set to the highest level during "handovers" between networked

cordless phones is comparable to cell phc
urban areas.

Cell phone base stations or masts emi
and at far greater power than cell phones
continuously only during calls. Between
the "screen asleep" but the power on, cel
regular pulse of EMR in order for base st
continuously keep track of the geographi
phones in their "cellular network." The C
associated with transmitter powers of 10
3G antennae use less power—on average
In rural areas, base station power output i
because of the vast areas requiring cover
distributed base stations, and cell phones
often at their maximum power output dur
maintain good communication [13,37]. C
of towers has increased tremendously in
smaller, but even more numerous "micro
throughout metropolitan environments nc
cell phone reception within previously re
locations such as in elevators and buildin

### 1.2. Electromagnetic field

An EMF is composed of an electric f

LIPPINCOTT WILLIAMS & WILKINS

EPIDEMIOLOGY



## Mobile Phone Use and the Risk of Acoustic Neuroma.

Epidemiology. 15(6):653-659, November 2004.

*Lonn, Stefan *; Ahlbom, Anders *; Hall, Per +; Feychting, Maria **

**Abstract:**

Background: Radiofrequency exposure from mobile phones is concentrated to the tissue closest to the handset, which includes the auditory nerve. If this type of exposure increases tumor risk, acoustic neuroma would be a potential concern.

Methods: In this population-based case-control study we identified all cases age 20 to 69 years diagnosed with acoustic neuroma during 1999 to 2002 in certain parts of Sweden. Controls were randomly selected from the study base, stratified on age, sex, and residential area. Detailed information about mobile phone use and other environmental exposures was collected from 148 (93%) cases and 604 (72%) controls.

Results: The overall odds ratio for acoustic neuroma associated with regular mobile phone use was 1.0 (95% confidence interval = 0.6-1.5). Ten years after the start of mobile phone use the estimates relative risk increased to 1.9 (0.9-4.1); when restricting to tumors on the same side of the head as the phone was normally used, the relative risk was 3.9 (1.6-9.5).

Conclusions: Our findings do not indicate an increased risk of acoustic neuroma related to short-term mobile phone use after a short latency period. However, our data suggest an increased risk of acoustic neuroma associated with mobile phone use of at least 10 years' duration.

? children ~ see Australian study.

- Our most recent epidemic curve estimates indicate that for primary brain cancer, in 2005 there were 20,000 new cases directly attributable to mobile phones; by the year 2010, the curve indicates that number will be on the order of 300,000 new cases worldwide.
- For eye cancer, the curve indicates 10,000 new cases worldwide in 2005 and 100,000 attributable cases by the year 2010.
- When general morbidity data for the range of symptoms being reported to our registry as consistent with electro-sensitivity are used as the dependent variable, the epidemic curve indicates that by the year 2015, one in every four persons who uses a mobile phone will have a symptom attributable to the phone.

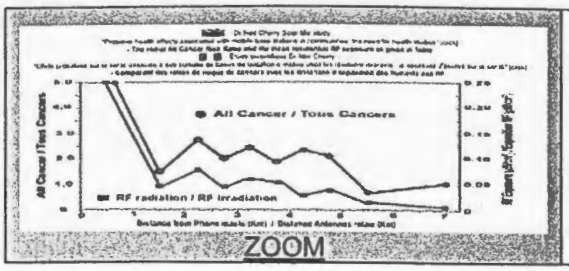
**PREVENTIVE INTERVENTION PROGRAM:**

Consistent with the public health protection goals of the Safe Wireless Initiative, we have initiated and active program of identifying and evaluating the range of protective interventions that may serve to mitigate the myriad adverse effects predicted by the exceedingly alarming epidemic curve projections. We have adopted the standard and time-tested Public Health Paradigm as our model, encompassing primary, secondary and tertiary preventive as complementary, bundled interventions. According to that template, primary preventions address issues of exposure; secondary preventions address issues of symptom mitigation; and tertiary preventives address issues of rehabilitation and long-term risk reduction.

Bolstered by our research program, we are now able to identify primary, secondary and tertiary interventions by their likely impact on the specific disease mechanisms contributing to clinical disease. For example, primary interventions are those that prevent the occurrence of inappropriately triggered cell-membrane mediated protective mechanisms leading to increased intracellular free radical concentration. Secondary preventions are those that restore disrupted intercellular communication that is the result of cell-membrane damage. Tertiary preventions are those that, when primary and secondary preventives are in place, facilitate the repair of damaged tissue. This model is parallel to that employed in clinical pharmacology and other mainstream programs for clinical intervention.

To facilitate our ability to "scratch beneath the surface" with regard to publicly available interventions, some of which are proprietary to the various commercial interests who produce them, we have begun a program of cooperation with what we term Strategic Alliance Partners. These relationships with other non-profits and commercial entities, allow us through non-disclosure and other types of confidential information protections, to evaluate proprietary science in depth. These accesses are critically important to our being able to assess which interventions work and which don't, and more importantly, to design strategies for combining interventions that will be of most positive impact to public health.

8 of 10 Studies



ZOOM

- Dr Neil Cherry Scientific study
"Probable health effects associated with mobile base stations in communities: the need for health studies"
- Étude scientifique Dr Neil Cherry
"Effets sur la santé probables associées à des stations de bases téléphonie mobile mobiles chez les résidents riverains : la nécessité d'études sur la santé"[UK]

www.next-up.org/Newsoftheworld/DatabaseCemEmf.php www.ijoeh.com/index.php/ijoeh/article/view/1309/0

-International Journal of Occupational and Environmental Health,
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# Epidemiological Evidence for a Health Risk from Mobile Phone Base Stations

*Vini G. Khurana, Lennart Hardell, Joris Everaert, Alicja Bortkiewicz, Michael Carlberg, Mikko Ahonen*

**Abstract**

Human populations are increasingly exposed to microwave/RadioFrequency (RF) emissions from wireless communication technology, including mobile phones and their base stations.
By searching PubMed, we identified a total of 10 epidemiological studies that assessed for putative health effects of mobile phone base stations. Seven of these studies explored the association between base station proximity and neurobehavioral effects and three investigated cancer.

- We found that eight of the 10 studies reported increased prevalence of adverse eurobehavioral symptoms or cancer in populations living at distances < 500 meters from base stations.
None of the studies reported exposure above accepted international guidelines, suggesting that current guidelines may be inadequate in protecting the health of human populations.

We believe that comprehensive epidemiological studies of longterm mobile phone base station exposure are urgently required to more definitively understand its health impact.

Key words: base stations; electromagnetic field (EMF); epidemiology; health effects; mobile phone; radiofrequency (RF); electromagnetic radiation

-International Journal of Occupational and Environmental Health,
Vol 16, No 3 (2010)

# Preuve épidémiologique d'un risque pour la Santé près des stations de bases de téléphonie mobile

*Vini G. Khurana, Lennart Hardell, Joris Everaert, Alicja Bortkiewicz, Michael Carlberg, Mikko Ahonen*

**Résumé**

La population humaine est de plus en plus exposée aux RadioFréquences (RF) micro-ondes provenant des technologies des communications du sans fil, y compris les téléphones mobiles et les antennes relais de leurs stations de bases.
En effectuant des recherches dans PubMed, *(ndlr : Publication scientifique Gouvernementale US)* nous avons identifié un total de 10 études épidémiologiques qui évaluent les effets sanitaires putatifs *(ndlr : estimés)* des stations de bases de téléphonie mobile.
Sept de ces études ont exploré l'association entre la proximité des stations de base et les neuro-effets et trois enquêtes ont investigué sur la co-promotion avec les cancers.

Nous avons constaté que huit des 10 études ont signalé une augmentation de la prévalence des symptômes délétères ou neurologique promoteurs de cancers chez les populations vivant à des distances de moins de 500 mètres des stations de base d'antennes relais.
Aucune de ces études scientifiques n'a signalé une exposition en-dessus des normes directrices internationales en vigueur, ce qui suggère que les directives actuelles peuvent être déclarées insuffisantes pour la protection de la santé des populations humaines.

Nous croyons que des études épidémiologiques approfondies sur le long terme sur l'exposition *(ndlr l'irradiation)* des populations résidantes à proximité des stations de bases de téléphonie mobile est d'urgence nécessaire pour mieux comprendre définitivement leurs impacts sur la santé.

Mots clés: stations de base; champs électromagnétique (CEM), épidémiologie, effets sur la santé; téléphones mobile; radiofréquence (RF); rayonnement électromagnétique.

E.S. Lab. Tests.

# ES NEWS – ES MARKERS

## New markers for Electro-sensitivity

Two new types of markers for electro-sensitivity have been recorded in the last few months. They add significantly to the existing battery of tests developed in the last three years for diagnosing pathological aspects of electro-sensitivity, such as heart rate variability, microcirculation, active electrical skin potentials, blood stress proteins, urinary melatonin, lymphocyte chemical sensitivity, mast skin cell degranulation, blood cell changes, spontaneous hand movements, etc.

## 1. Alpha amylase and cortisol in saliva

A new non-invasive test for radio-frequency–EMF sensitivity has been developed using stress biomarkers in saliva after exposure to very low levels of RF radiation from a mobile phone transmitter. These biomarkers, alpha amylase and cortisol, are also associated with diabetes, cardiovascular disease and other stress-related disorders.

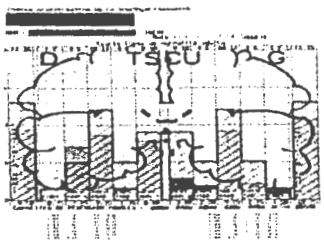
The study (Augner C et al., 2010) *Biomed Environ Sci.* 23(3): 199-207) used 900 Mhz GSM in five 50-minute exposure sessions at 3 power densities: high: 2126.8 microW/m2 (0.9 V/m), lower than Russian standards; medium: 153.6 microW/ m2 (0.3 V/m), close to WiFi transmitter signals; low: 5.2 microW/ m2 (0.04 V/m), typical of many rural/surburban areas without smart meters or WiFi near, but still having good cell phone receptions. The participants responded to all 3 exposure conditions in 2 of the biomarkers, alpha amylase and cortisol, but not IgA.

## 2. Encephaloscan

Next-up reported on 29th August that Philippe, suffering from EHS, lived in a French EMF-free refuge during the winter of 2009-10. His medical condition was tracked by the Association de Recherche Thérapeutique Anti-Cancéreuse (ARTAC), an independent group of doctors and researchers based in Paris, specialising in the biological, therapeutic and clinical study of cancer, including EHS. A group headed by Professor Dominique Belpomme is studying a considerable number of EHS. (An update on their work, "État des lieux des recherches de l'ARTAC sur les EMS et l'EHS", was published on 18 December 2009.) Philippe underwent various medical examinations before his stay in the forest, including an encephaloscan at the Centre d'Exploration de la Fonction Cérébrale run by Dr Ph Lebar in Paris.

At present an encephaloscan is the best diagnostic marker of symptoms in the brains of people who are EHS, providing scientific proof of the EHS condition. The scan gives an image of the arterial irrigation of the two hemispheres of the brain. The results are analysed by comparison with standard variations. Columns can be shown diagrammatically to represent zones with adequate circulation in red and orange, and zones with inadequate circulation in yellow and blue.

*Diagram 1 represents an encephaloscan before Philippe's arrival in the Forêt de Saoû. The circulation levels in several areas of both hemispheres are seriously affected.*



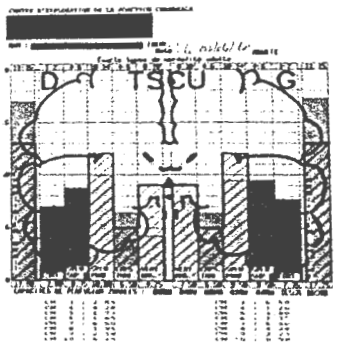




*Diagram 2 represents an encephaloscan after Philippe has lived for three months in the Forêt de Saoû, an area with very low artificial radiation. The circulation levels in both hemispheres of the brain are significantly improved. Philippe was no longer in a weakened state.*

## Mums-to-be: protect your baby

A new garment to protect the unborn baby from EM radiation is available from www.mum-mywraps.com. This New Zealand company offers free shipping to anywhere in the world. These types of maternity dresses and wraps, apparently long common in China, have been given a boost following recent research showing behavioural effects on children from mothers' exposure to mobile phone radiation in pregnancy.

## Traditional light bulbs

Some Tesco shops are selling 60W traditional light bulbs for heavy duty. Some Focus shops are still selling 60 W traditional bulbs. Traditional light bulbs, minimum five per order, are said to be available from Switzerland, ordering in German, from www.righi-licht.ch/topic12107.html. The Times of London reported on 16th October that a German retailer has avoided the ban on bulbs of more than 60 W by selling traditional 75 W and 100 W lightbulbs as "heatballs".

Car

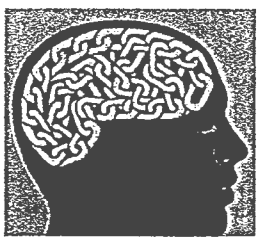
mobile phones:

- use an earpiece or headset
- keep wireless devices away from your body
- use the speaker-phone
- text rather than talk
- buy a wireless device with a low SAR

"Please do not wait for the FCC to make a more serious warning or ban the phones altogether."

## "Government must inform us of cell phone risk"

The San Francisco Chronicle on 28th April had an article "Government must inform us of cell phone risk" by Joel Moskowitz, director of the Centre for Family and Community Health in UC Berkeley's School of Public Health. It stated that "we reviewed 23 case-control studies that examined tumor risk due to cell phone use. Although as a whole the data varied, among the 10 higher quality studies, we found a harmful association between phone use and tumor risk. The lower quality studies, which failed to meet scientific best practices, were primarily industry funded."



## San Francisco law requires SAR labels

The Daily Mail reported on 16th June that San Francisco passed a law requiring SAR warning labels on new mobiles. The Board of Supervisors voted 10-1 on the measure, expected to be signed into law by Mayor Gavin Newsom. Officials said the law was not meant to discourage mobile phone use, but about informing consumers.

## Mobile phone companies threaten San Francisco over warning labels

The New York Times on 15th June reported on San Francisco's requirement that retailers of mobile phones should display the SAR (specific absorption value) in type at least 11 point high. On 25th June it reported that the CTIA, the wireless association, had threatened to relocate its annual three-day convention in October 2010 away from San Francisco. After the vote it did so. Mayor Newsom asked why the phone companies spent so much money to kill the bill. It made him more fearful. The Washington Post on 29th June said the CTIA had now decided to keep their conference in San Francisco this year but threatened not to do so in the future.

## US Congress proposal for new standards, warnings and research

The Washington Post on 30th June reported that Dennis J Kucinich will introduce a bill for a federal research program on the affects of mobile phone radiation on users. The bill will also call for a warning label for mobile phones, as more research indicates links between long-term use and cancer. He also said that consumers deserve to have up-to-date standards, which are now decades old.

## France bans mobiles for younger pupils

Under Article 72 of 11th May 2010, and the Senate vote of 8th October 2009, France now bans pupils using mobiles in all kindergartens, elementary schools and colleges (up to ages 15-17). All mobiles sold in France must mention health risks from overuse.

## Mobile use slows reactions

On 28th February the Daily Mail reported that tests by the Transport Research Laboratory show that motorists talking on hands-free phones are more dangerous than drink-drivers, with 30% slower reaction-times than those slightly over the drink limit. Their reflexes remain dulled for up to ten minutes after a conversation. When asked to brake suddenly at 70mph, someone over the limit took 13 feet longer to come to a halt than a normal driver, but a hands-free kit user took an extra 26 feet. On 31st March it reported that Watson et al. at Utah found that 97.5% of motorists talking on hands-free mobiles had reaction times as slow as drunk drivers, taking 20% longer to brake, and with less awareness of traffic around them, shown by a 30% increase in following distance. Memory declined by 11% and maths ability by 3%.

## IARC appoints industry-financed 'sceptic' Interphone leader

The new head of the Environmental Section of the International Agency for Research on Cancer is to be Joachim Schuz, according to Microwave News on 9th June. Schuz will supervise the remaining Interphone project and the 2011 IARC review of RF cancer dangers. Schuz is one of the diminishing group of sceptics – "also known as the ICNIRP contingent". At Mainz Schuz apparently found a more than doubled risk of brain tumours for long-term mobile phone users, but asserted that this was not statistically significant. Since 2005 he has been at the Danish Cancer Society which produced the notorious study financed by the phone industry; this found that mobile subscribers were protected from all cancers and 17 other illnesses! Schuz seems to act for the electricity and mobile industry. He apparently declared to the EU in 2009 that he received 6-year funding from the Electric Power Research Institute for 2006-2012 and was a consultant to Wissenschaftlicher Beirat Funk, a mobile group with telecom funding. Schuz is also a member of another sceptics' organization, SCENIHR.

## Harper's Magazine: "the largest public-health crisis in the history of the human race"

A ten-page article by Nathaniel Rich called "For Whom the Cell Tolls" was published in Harper's Magazine in May. It highlighted Lloyd Morgan's work in analyzing statistics on