

The Case for Precaution in the Use of Cell Phones

Advice from University of Pittsburgh Cancer Institute Based on Advice from an International Expert Panel

ANALYSIS OF RECENT STUDIES

Electromagnetic fields generated by cell phones should be considered a potential human health risk. Sufficient time has not elapsed in order for us to have conclusive data on the biological effects of cell phones and other cordless phones—a technology that is now universal.

Studies in humans do not indicate that cell phones are safe, nor do they yet clearly show that they are dangerous. But, growing evidence indicates that we should reduce exposures, while research continues on this important question.

Manufacturers report that cell and wireless phones emit electromagnetic radiation. Electromagnetic fields are likely to penetrate the brain more deeply for children than for adults. Modeling in the diagram below estimate that young children are more susceptible to electromagnetic fields due to smaller sized brains and softer brain tissue.

1) Electromagnetic fields from cell phones are estimated to penetrate the brain especially in children. (Figure 1.) [1, 2]

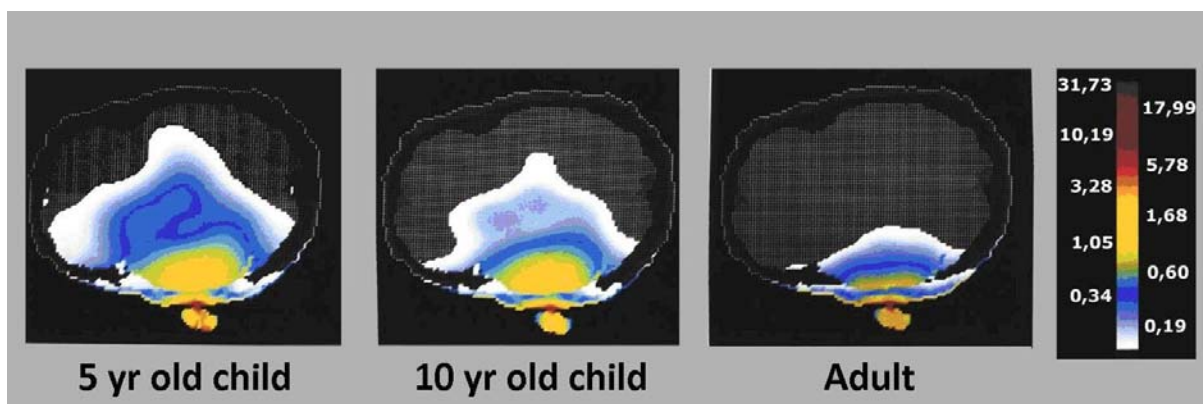


Figure 1. Estimation of the penetration of electromagnetic radiation from a cell phone based on age (Frequency GSM 900 Mhz) (On the right, a scale showing the *Specific Absorption Rate* at different depths, in W/kg) [1]*

2) Living tissue is vulnerable to electromagnetic fields within the frequency bands used by cell phones (from 800 to 2200 MHz) even below the threshold of power imposed by most safety standards (1.6 W/Kg for 1g of tissue), notably an increase in the permeability of the blood-brain barrier and an increased synthesis of stress proteins. [3, 4, 5, 6]

* Researchers in the INTERPHONE study obtained comparable results with 129 more recent models cell phones (frequencies of 800 to 1800 MHz, PDC and GSM) on models of an adult brain, but have not assessed absorption in children's brains. [2]

The most recent studies, which include subjects with a history of cell phone usage for a duration of at least 10 years, show a possible association between certain benign tumors (acoustic neuromas) and some brain cancers on the side the device is used.[6, 7, 8, 9]

However, human epidemiological studies on cell phones conducted to date cannot be conclusive. Due to their recently increased use, we are not yet able to evaluate their long term impact on health. Even where an association between exposure and cancer is well established and the risk very high -- as with tobacco and lung cancer -- under similar study conditions (in other words with people who smoked for less than 10 years) it would be difficult, if not impossible, to identify an increased risk of cancer, as the risk appears mostly 15 to 35 years later. [7]

THE TEN PRECAUTIONS

Given the absence of definitive proof in humans of the carcinogenic effects of electromagnetic fields of cell phones, we cannot speak about the necessity of *preventative* measures (as for tobacco or asbestos). In anticipation of more definitive data covering prolonged periods of observation, the existing data press us to share important prudent and simple measures of *precaution* for cell phone users, as have been variously suggested by several national and international reports. [6, 9, 10, 11, 12]

These measures are also likely to be important for people who are already suffering from cancer and who must avoid any external influence that may contribute to disease progression.

1. Do not allow children to use a cell phone except for emergencies. The developing organs of a fetus or child are the most likely to be sensitive to any possible effects of exposure to electromagnetic fields.
2. While communicating using your cell phone, try to keep the cell phone away from the body as much as possible. The amplitude of the electromagnetic field is one fourth the strength at a distance of two inches and fifty times lower at three feet.

Whenever possible, use the speaker-phone mode or a wireless Bluetooth headset, which has less than 1/100th of the electromagnetic emission of a normal cell phone. Use of a hands-free ear piece attachment may also reduce exposures.

3. Avoid using your cell phone in places, like a bus, where you can passively expose others to your phone's electromagnetic fields.
4. Avoid carrying your cell phone on your body at all times. Do not keep it near your body at night such as under the pillow or on a bedside table, particularly if pregnant. You can also put it on "flight" or "off-line" mode, which stops electromagnetic emissions.
5. If you must carry your cell phone on you, make sure that the keypad is positioned toward your body and the back is positioned toward the outside so that the transmitted electromagnetic fields move away from your rather than through you.
6. Only use your cell phone to establish contact or for conversations lasting a few minutes as the biological effects are directly related to the duration of exposure. For

longer conversations, use a land line with a corded phone, not a cordless phone, which uses electromagnetic emitting technology similar to that of cell phones.

7. Switch sides regularly while communicating on your cell phone to spread out your exposure. Before putting your cell phone to the ear, wait until your correspondent has picked up. This limits the power of the electromagnetic field emitted near your ear and the duration of your exposure.
8. Avoid using your cell phone when the signal is weak or when moving at high speed, such as in a car or train, as this automatically increases power to a maximum as the phone repeatedly attempts to connect to a new relay antenna.
9. When possible, communicate via text messaging rather than making a call, limiting the duration of exposure and the proximity to the body.
10. Choose a device with the lowest SAR possible (SAR = Specific Absorption Rate, which is a measure of the strength of the magnetic field absorbed by the body). SAR ratings of contemporary phones by different manufacturers are available by searching for "sar ratings cell phones" on the internet.

CONCLUSION

The cell phone is a remarkable invention and a breakthrough of great social importance. Our society will no longer do without cell phones. None of the members on the expert committee has stopped or intends to stop using cell telephones. This includes Dr. David Servan-Schreiber, a 16 year survivor of brain cancer. However, we, the users, must all take precautionary measures in view of recent scientific data on the biological effects of cell phone use, especially those who already have cancer.

In addition, manufacturers and service providers must also assume responsibility. It is their responsibility to provide appliances and equipment with the lowest possible risk and to constantly evolve their technology in this direction. They should also encourage consumers to use their devices in a way that is most compatible with preserving their health.

In the early 1980's, the owners of asbestos mines were reduced to bankruptcy as a result of lawsuits brought by the families of deceased exposed workers. A few years later, a key executive of Johns Manville, the most prominent company, drew lessons from the years of struggle of his industry against medical data and the scientists who were drawing attention to the risks of asbestos. He concluded with regret that greater warnings for the public, the establishment of more effective precautions, and *more extensive* medical research "could have saved lives, and probably also shareholders, the industry, and the benefits of its product." [14, 15]

We call on the cell phone companies to provide independent access to records of use so that appropriate studies can be carried out.

That is what we wish for today's cell phone industry. We do not need to ban this technology, but to adapt it – to harness it – so that it never becomes a major cause of illness.

INTERNATIONAL EXPERT COMMITTEE

Bernard Asselain, MD, Chief of the Cancer Biostatistics Service, Curie Institute, Paris, France

Franco Berrino, MD, Director of the Department of Preventative and Predictive Medicine of the National Cancer Institute, Milan, Italy

Thierry Bouillet, MD Oncologist, Director of the Radiation Institute, Avicenne University Hospital Center Avicenne, Bobigny, France

David Carpenter, MD, Director Institute for Health and the Environment, University of Albany, former Dean, School of Public Health

Christian Chenal, MD, Emeritus Professor of Oncology, University of Rennes 1, France and former director of the National Center for Scientific Research (CNRS) team “Radiation, Environment, Adaptation”

Pr Jan Willem Coebergh, Oncologist, Department of Public Health, University of Rotterdam, The Netherlands

Yvan Coscas, MD Oncologist, Chief of the Department of Radiotherapy, Hôpital de Poissy St Germain, France

Pr Jean-Marc Cosset, Honorary Chief of Oncology/Radiotherapy of the Curie Institute, Paris, France

Pr Devra Lee Davis, Director, Center for Environmental Oncology of University of Pittsburgh Cancer Institute, USA

Michel Hery, MD Oncologist, Chief of the Department of Radiotherapy, Princess Grace Hospital Center, Monaco

Pr Ronald Herberman, Director of the University of Pittsburgh Cancer Institute, USA

Pr Lucien Israël, Emeritus Professor of Oncology, University of Paris XIII, Member of the *Institut de France*

Jacques Marilleau, Engineer SUPELEC, former physicist at the Commissariat of Atomic Energy and at CNRS Orsay, France

Jean-Loup Mouysset, MD Oncologist, Polyclinique Rambot-Provençale, Aix-en-Provence, France

Philippe Presles, MD, President of the Institut Moncey for Prevention and Health, Paris, France - Author of « PREVENIR », Editions Robert Laffont, 2006

Pr Henri Pujol, PhD Oncologist, former President of the National Federation Cancer Centers, France

Joël de Rosnay, PhD, Former Assistant Professor of Biology, Massachusetts Institute of Technology, Boston, USA, Scientific writer

Simone Saez, PhD, former Director of the Cancer Biology unit of the Comprehensive Cancer Center of Lyon, France

Annie Sasco, MD, Doctor of Public Health, Medical epidemiologist, Director of the Epidemiology Team for Cancer Prevention – INSERM, University Victor Segalen, Bordeaux 2, France

David Servan-Schreiber, MD, PhD, Doctor of Science, Clinical Professor of Psychiatry, University of Pittsburgh, Author of “ANTICANCER – A New Way of Life”, Viking

Patrick Souvet, MD, Cardiologist, President of the Association *Santé Environnement Provence*, Aix-en-Provence, France

Pr Dan Wartenberg, Chief, Division of Environmental Epidemiology, UMDNJ Robert Wood Johnson Medical School

Jacques Vilcoq, MD, Oncologist, Clinique Hartmann, Neuilly-sur-seine, France

BIBLIOGRAPHY

1. Gandhi, O.P.G. Lazzi, and C.M. Furse, *Electromagnetic Absorption in the Human Head and Neck for Cell Telephones at 835 and 1900 MHz*. IEEE Transactions on Microwave Theory and Techniques, 1996. **44**(10): p. 1884-1897.
2. Cardis, E., et al., *Distribution of RF energy emitted by cell phones in anatomical structures of the brain*. Physics in Medicine and Biology, 2008. **53**: p. 1-13.
3. Blank, M., *Health Risk of Electromagnetic Fields: Research on the Stress Response in The Bioinitiative Report : A Rational for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF)*. The Bioinitiative Working-Group, D. Carpenter and C. Sage, Editors. 2007
4. Johannsson, O., Evidence for effects on immune function, in *The Bioinitiative Report : A Rational for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF)*. The Bioinitiative Working-Group, D. Carpenter and C. Sage, Editors. 2007
5. Roux, D., et al., *High Frequency (900 MHz) low amplitude (5 V m⁻¹) electromagnetic Weld: a genuine environmental stimulus that affects transcription, translation, calcium and energy charge in tomato*. Planta, 2007.
6. Commission_de_la_sécurité_des_consommateurs. *AVIS RELATIF A L'INFORMATION DU CONSOMMATEUR DANS LE DOMAINE DE LA TELEPHONIE CELL* 02/08. 2008 [Cited; Available from: <http://www.securiteconso.org/article647.html>].
7. Walker, W.J. and B.N. Brin, *U.S. lung cancer mortality and declining cigarette tobacco consumption*. Journal of Clinical Epidemiology, 1988. **41**(2): p. 179-85.
8. Hardell, L., K.H. Mild, and M. Kundi, *Evidence for brain tumors and acoustic neuromas, in The BioInitiatives Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF)*. The BioInitiative Working Group, D. Carpenter and C. Sage, Editors, 2007.
9. Board_of_the_National_Radiological_Protection_Board, *Cell Phones and Health*. 2004, National Radiological Protection Board: London, UK. p. 1-116.
10. Agence_Française_de_Sécurité_Sanitaire_Environmentale, *Avis de l'AFSSE sur la téléphonie cell*. 2005, Agence Française de Sécurité Sanitaire Environmentale: Paris, France.
11. Ministère_de_la_Santé. *Téléphones cells : santé et sécurité*. 2008 [cited 2008 May 16]; Available from: http://www.sante-jeunesse-sports.gouv.fr/actualite-presse/presse-sante/communiqués/telephones-cells-sante-securite.html?var_recherche=portable.
12. CRIIREM Centre de Recherche et d'Information Indépendantes sure les Rayonnements Electromagnétiques. *Téléphones cell: les bons réflexes!* 2006 [Cited 2008 May 26]; Available from: http://riimen.blogspirit.com/precautions_protections/.
13. Sadetzki, S., et al., *Cellular phone use and risk of benign and malignant parotid gland tumors--a nationwide case-control study*. American Journal of Epidemiology, 2008. **167**(4): p. 457-67.
14. Institut_National_de_Recherche_et_de_Sécurité, *Rayonnements électromagnétiques des téléphones portables - Mesures des émissions de divers appareils*, in *Cahiers de notes documentaires - Hygiène et sécurité du travail - N° 176*. 1999.
15. European_Environment_Agency, *Late Lessons from Early Warnings: the precautionary principle 1896–2000*, in *Environmental issue report*. 2001.
16. Sells, B., *What asbestos taught me about managing risk*. Harvard Business Review, 1994(March/April): p. 76-89.