

## World expert explains link between EMF and human disease, radiation in Ireland 1,000 times higher than recommendation

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In a mere six years half of us will become electromagnetically sensitive. A prediction by Salzburg's Dr. Gerd Oberfeld who addressed the Irish Doctors Environmental Association (IDEA) April 9, parallels the prediction by the Royal College of Physicians last year which predicted that half the Irish population will have "some form of cancer" by the year 2025.

Dr. Oberfeld spoke at the Eithne Naylor / Enda Dalton Memorial Lecture on the topic of "Electromagnetic Pollution and Our Environment" sponsored by IDEA. He has practiced environmental medicine with the Office of the Provincial Government of Salzburg Provincial Health Directorate, Department of Health, Hygiene and Environmental Medicine since 1992 and speaker for the Austrian Medical Association on health issues since 1994.



Oberfeld is credited with the policy implemented the city of Salzburg which has maintained the city as having the lowest electromagnetic radiation levels in Europe.

In 2006 Oberfeld drew attention when, along with Orjan Hallberg, of Hallberg Independent Research,

Trångsund, Sweden, the two released research which predicted that half of humanity will suffer electromagnetic sensitivity by the year 2017 in the journal *Electromagnetic Biology and Medicine* published by Informa Healthcare. "Contrary to the views of mainstream medical authorities, Figure 1 shows that the group of electrosensitive people around the world, including Sweden, is not just a small fraction that deviates from the rest of the healthy population. Instead, it points at the possibility that electrosensitivity will be more widespread in the near future. The extrapolated trend indicates that 50 percent of the population can be expected to become electrosensitive by the year 2017."

**Like the famous photo of Nikola Tesla between two globes of power, Dr. Gerd Oberfeld, of the Department of Public Health in Salzburg, Austria is credited with overseeing public health in the city with the lowest ambient levels of electromagnetic radiation in Europe.**

Even before Oberfeld could begin, several people had to leave the Carmelite Centre in Dublin's Aungier Street, claiming discomfort from the toxic atmosphere generated by the

concentration of cell phones and electromagnetic frequencies just a short distance from the capital's premier shopping street and St. Stephen's Green.

### **Non-ionizing and Ionizing Radiation**

Oberfeld organized his presentation along the classic division of the electromagnetic spectrum between non-ionizing and ionizing radiation. Non-ionizing radiation occurs from the lowest levels at what is called the natural Schumann Resonance (3 - 69 Hz) which overlap artificial ELF / VLF frequencies from as low as 50-60 Hz. Non-ionizing radiation ranges through radiation produced by visual display units, fluorescent lamps, radio and television with the upper limits including the second, third and fourth generation of digital communications up to any including radar infrared and visible light. Importantly he included the concept of harmonics - of various low levels of radiation which occur simultaneously and the compact fluorescent lamp (what we call energy-saving light bulbs).

Ionizing radiation has long been recognized as dangerous to human health. Oberfeld traced the process of how ultra-violet radiation, x-rays and gamma radiation produce free electrons at the high end of the electromagnetic spectrum. Ionizing radiation interacts with oxygen in human tissue which forms what Oberfeld called superoxide, an oxygen molecule with an additional free electron. This in turn, reacts with nitric oxide which is a signal molecule needed by the body and forms peroxynitrate. "This is one of the most important molecules in our bodies because it's the molecule that will interact with proteins, with lipids, with certain enzymes and it will cause the definitive damage in the cell," explained Oberfeld.

"That is the way ionizing radiation is acting. The same is true for non-ionizing radiation where also free electrons are produced by the NADH oxydase," he said. PubMed, the U.S. National Library of Medicine of the National Institutes of Health, supports Oberfeld's interpretation of the effects of NADH oxidase on smooth muscles leading to DNA damage with research presented by scientists from Taiwan.

### **Five Types of Electromagnetic Frequencies**

There are five different types of EMF: Static electric fields (ie. produced by pulling a synthetic jumper over your head and the hair standing up), static magnetic fields (from nature which a compass measures), ELF magnetic fields, ELF electric fields and radio frequency and microwaves.

Sources of ELF magnetic fields include pylons, transformers, water pipes, earthing cables and wires as well as clock radios and other devices which have small transformers inside the case. Regarding pipes and wiring, Oberfeld said they are a source of electromagnetic radiation which is frequently overlooked and can travel ten to twenty metres. "It is possible that there is a lot of current flowing," he said.

Oberfeld explained that ELF is the acronym for Extremely Low Frequency magnetic fields which are in the 3 Hz to 3 kHz at the lower end of the spectrum. The measurements are based on units of energy called Tesla (after the Serbian pioneer inventor, Nikola Tesla, 1856 - 1943) or, especially in the U.S., Gauss (after the German mathematician Carl Friedrich Gauss, 1777 - 1855).

In terms of area covered by ELF fields, Oberfeld cited the wide spread of magnetic fields from power line on pylons as opposed to buried cables. Pointing to a diagram of a typical energy field created by a power line on pylons, Oberfeld said, "You can see pylons or structures will emit magnetic fields if you are close down to the wire the field is higher and if you go away it There's a lot of discussion in Austria about 380 kV power lines and a lot of citizen groups urge to have earth cable used instead of the other ones," he said, noting that the space required for the cabling is significantly less.

The doctor produced a chart comparing the difference between the three ways of power transmission: pylons / overhead cables are detectable at a distance of 80 metres; buried cables produce a spike in energy which is higher than pylons at close proximity to the line; but shielded cabling buried two metres underground is barely detectable. Pointing to the peaked underground cabling measurement, Oberfeld said, "If you use earth cable you can see that at about 20 metres your are in a safe level so its a very fine way to reduce magnetic fields."

Domestic appliances such as televisions, refrigerators aquarium pumps, clock radios and electric cookers all produce electromagnetic fields with the aquarium being of particular interest because they use inductive processes which produce very strong fields. Oberfeld noted the recent development of energy-saving domestic induction cookers. Unlike other forms of cooking, heat is generated directly in the pot or pan opposed to being generated in the stovetop by electrical coils or burning gas. An alternating electric current flows through the coil producing an oscillating magnetic field that creates an electric current in the pot heats the food. These cookers use a large current at low voltage. "Induction cookers work with kHz so the power is transferred to a magnetic field will make the heating of the pan. The interface is kilohertz, very bad, very strong magnetic fields. I wouldn't recommend to use it," he said.

Oberfeld is adamant that the home is no place for DECT phones or wi-fi. In a domestic situation Oberfeld recommends strict caution. "When it comes to other technologies like wi-fi or cordless phones," he said, "one has to be aware that we have a transmitter which is a nexus point with respect to wi-fi but also we have the notebook or the computer where there's another transmitter as well. If you use a notebook or pad or whatever you're very close to the wi-fi antenna and you put it on your knees and the antenna is within the tablet for example you're exposed to very, very high levels of microwave radiation and it's the same frequency as is used in the microwave oven and the effects are directly to the cells. In order to prevent any effect and in order to apply the Precautionary Principle, my advice would be not to use wi-fi or DECT technology anyplace."

### **The Evidence for Causing Disease**

The increase in our reliance on electricity parallels a rapid rise in the incidence of young childhood leukaemia. Oberfeld cited a study by Stelairova and Fourcher in 2004 that uncovered an annual increase in childhood leukaemia on average of 1.4 percent a year from 1970 - 1999. This is just show you," said Oberfeld, " that this is not an incidence that is going down. It is an incidence that is steadily increasing." The incidence of childhood leukaemia reaches its peak around the age of two which is in line with other countries. According to a joint study between the National Cancer Registry and University College Cork, in Ireland the survival rate of cancers was high but the incidence of leukaemia is significantly higher. Researchers concluded, "Observed 5-year survival in Ireland (79% overall) was slightly higher than European and US averages, and was significantly higher

for acute non-lymphocytic leukaemia (67%) and (compared with the USA) significantly lower for Hodgkin lymphoma (83%).”

Oberfeld’s remarks build on the 1996 observation by William Reville, a senior lecturer in Biochemistry and Director of the Central Electron Microscopy Unit, University College Cork, that “there is evidence of a weak association between increased exposure and an increased risk of leukaemia in children.” However, the title of Reville’s work “Radiation from Electric Power Is Not a Significant Cause of Cancer” published in *The Irish Times* could have sidetracked further Irish research.

Oberfeld cited a study by Milham that there is a “switch-on effect” of leukaemia following electrification. An increase of ten percent in electrification results in an increase of leukaemia by 24 percent. Underscoring the Milham results, Oberfeld also cited a German study using a moving cut point of exposure which showed that childhood leukaemia starts to increase at 0.1  $\mu$ T in a ratio which is associated with 24-hour exposure to electric fields.

Finally in 2001, the International Agency for Research on Cancer, part of the World Health Organization based in Lyon recognized that extremely low frequency magnetic fields are possible carcinogenic to humans in relation to childhood leukaemias. It marked a distinct change in perception about the ability of low frequency electromagnetic radiation from solely childhood leukaemia to the who area of being classified as being a full-blown carcinogen.

A year later, in the 2002 California EMF Program three epidemiologists came to a similar conclusion, admitting that ELF magnetic fields ranged from possible to definitive as a cause of leukaemia in both adults and children, adding the possibility of causing brain tumours in adults, miscarriage and Motorneurone Disease (MND). The group concluded, however, that there was inadequate evidence to support claims ELF magnetic fields were a factor in brain tumours in children, breast cancer, Alzheimer’s Disease or sudden heart attacks. “The BioInitiative group made strong statements on those in 2007 so five years later they judged it in a similar way that there might be a possible association,” said Oberfeld.

With funding from the EU, the IARC conducted a large-scale investigation into the effects of ELFs used in the cell phone industry called the Interphone Study. The overall result of the Interphone Study released last year remains contentious because, while admitting the possibility of increased incidence of cancers, researchers could find no increase in the risk of gliomas or meningiomas (brain tumours). The study does, however, admit the possibility that the duration of exposure can play an important part in the development of tumours.

### **Standards: Risky Business or Business Risk**

“When it comes to standards and recommendations, you might be aware of the recommendation of ICNIRP which is the International Commission on Non-ionizing Radiation Protection which is based in Munich,” said Oberfeld, “which is taken by the WHO and the European Union which is 100  $\mu$ T. This guideline value is okay if you add, that it doesn’t cover long term effects. There are some countries, that have for power lines, in order to reduce the exposure and in order to reduce the risk, lower limit values. For example Italy 3  $\mu$ T and Switzerland 1  $\mu$ T. In Austria new power lines that need an environmental impact assessment have to apply to 1  $\mu$ T as well. The BioInitiative working group recommended in 2007 0.1  $\mu$ T and this is for long-term effects.”

“I think that even in 1998 the ICNIRP guidelines were out of date. I think they were highly biased in favour of the thermal effects and not the non-thermal effect,” said Oberfeld.

The BioInitiative Report ([www.bioinitiative.org](http://www.bioinitiative.org)) of 2007 states “While new ELF limits are being developed and implemented, a reasonable approach would be a 1 mG planning limit for habitable space adjacent to all new or upgraded power lines and a 2 mG limit for all other construction. It is also recommended for that a 1 mG limit be established for existing habitable space for children and/or women who are pregnant.”

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The bottom line in the on-going confusion over standards is that Swiss Re, the world's largest and most diversified reinsurers, operating in more than 20 countries, and with a presence on all continents, refuses to insure the industry.

### **Sleeping on a barbeque?**

Regarding alternating fields which are measured in volts per metre (V/m), the frequency range is zero to 3 kHz. Observing that there are very few epidemiological studies on the relationship of electrical fields to the incidence of cancer, Oberfeld referred to a 1996 study by Welsh Biologist Roger Coghill et al. which measured the radioactivity of the bed places of children suffering leukaemia. “The referent level is below 5 volts per metre measured in the bed. This ratio is 1 of course and then the exposure between 5 and 9 that ratio increased and higher than 10 Volts up to 19 Volts per metre, the ratio was three which was a three-fold increase of risk associated with those electric fields to see leukaemia under the age of 15.

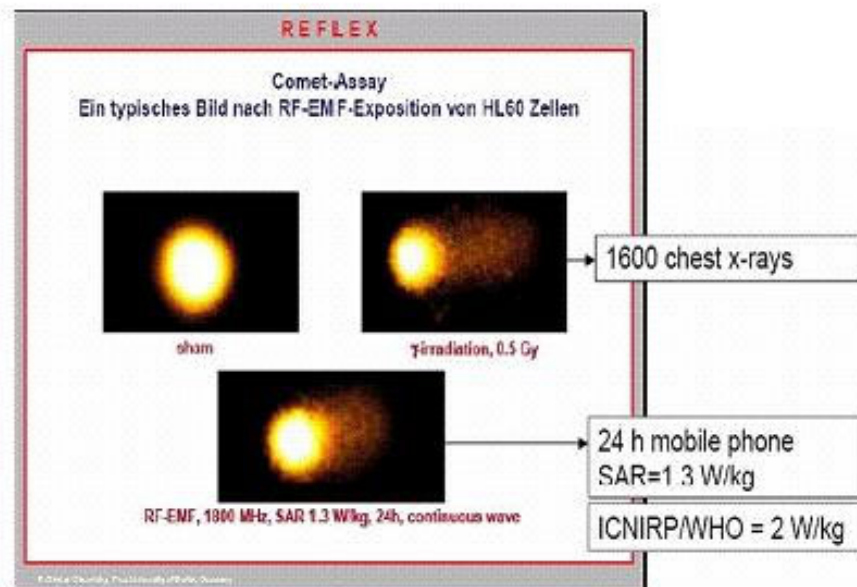
“When we have external electric fields,” Oberfeld continued, “it will lead to body currents and this is called influence. I stated there are very few epidemiological studies but there is very good experience in the field of biology and environmental medicine - a lot of case studies especially in relationship with sleep, vitality and concentration - so if there is some mitigation done in the sleeping room or the office it will get better usually. There are some guideline values: the TCO which is quite common now for video display units. You can find it on the monitors. They will have to stick to below 10 Volts per metres at a distance of 30 centimetres.... The building biology standard in Germany has three values (0.3 V/m, 1.5 V/m and 10 V/m) so we should try to be below 1 V/m to say it roughly.”

To lessen the effects of alternating electric fields, Oberfeld recommended:

- shielded cables
- demand switches for bedrooms
- screened distributors
- shielded lamps
- shielded plugs for PCs and monitors

Oberfeld introduced his remarks on Radiofrequency and Microwave Radiation with photographs of familiar sights - a radar tower at an airport, a communications mast near a

## What happens to our cells when they are exposed to mobile phone radiation?



The bottom picture shows that the DNA damage in living cells from 24 hours of mobile phone radiation is similar to a dose of gamma rays from a radioactive isotope, equivalent to about 1600 chest x-rays.

Small fragments of broken DNA stream out of the cells like the tail of a comet. The size of the tail is a measure of DNA damage.

residential area, a DECT telephone and a desktop internet router - saying, "The sources get closer and closer and they grow and grow."

To set the stage for his remarks about cell phone use, Oberfeld went back to a machine dating from to 1932 and its handbook called *Shortwave Therapy: The medical Application of Shortwaves* by Erwin Schliephake (1894 - 1995) outlining the use of a transmitter with headphones which indicates a suspected link between brain activity and disease, specifically a warming effect. The Schliephake machine used kHz in the higher mHz range. "There is no need to have the microwave oven frequency," said Oberfeld, "to have a heating effect which is 2,400 mHz, the microwave oven, so it works with 10 mHz as well." The significance of Schliephake's work is that as early as the 1930s symptoms occurred after long exposure to the transmitter including: strong fatigue, restlessness, nervousness, fear and pessimism, difficulty falling asleep, waking with a start, strong fatigue or "waking up feeling washed out," as Oberfeld put it.

Drawing from the EU's 2004 REFLEX Project (*Risk Evaluation of Potential Environmental Hazards from Low Frequency Electromagnetic Field Exposure Using Sensitive in vitro Methods*), Oberfeld displayed images of cells which exhibited DNA damage. The image showed a near-identical appearance between a cell exposed to the equivalent of 1,600

chest x-rays and a cell exposed to a mobile phone with a specific absorption rate (SAR) of 1.3 W/kg for 24 hours - .7 W/kg below ICNIRP / WHO guidelines of 2 W/kg.

### **The Latest Hard Science**

In 2006 Swedish Oncologist Lennart Hardell and his colleagues at University Hospital, Orebro published research showing a statistically significant 1.4-fold increase in risk for brain tumours on the same side of the head as the mobile phone was used. "The picture gets even clearer," said Oberfeld, "if you put into account the hours a mobile phone is used. Between 2,000 - 3,000 hours you have a fourfold increased risk for digital phones. Let's assume a person uses a mobile phone for one hour a day. In one year it will be 365 hours. In ten years we have 3,600 so that's a logical pattern.

"When it comes to age groups," he said, "the younger you are the more areas of the brain will be affected." All ages grouped together show an increase in brain tumours but for people who started to use cell phones before the age of 20, the rate of tumours is nearly three times greater than rate of all groups, indicating, according to Oberfeld, "There's a distinct increase with respect to age.

The mechanism for the development of disease from electromagnetism can be found in research by Joseph Friedman, Sarah Kraus, Yirmi Hauptman, Yoni Schiff and Rony Seger published in the *Biochemical Journal* 2007. Titled *Mechanism of short-term ERK activation by electromagnetic fields at mobile phone frequencies*, indicates that electromagnetic fields affects the behaviour of proteins in membranes. When hit by an EMF 875 mHz frequency (frequency of a typical GSM cell phone), the membrane produces ROS (reactive oxygen species). ROS are chemically reactive molecules that are naturally occurring. It is only when confronted by stress (heat, ultraviolet light or ELF's) that ROS molecules shed extra electrons - free radicals - forming Super Oxide which combines with Nitric Oxide resulting in Peroxynitrite (NO<sub>3</sub>).

Peroxynitrite is an anion, an ion with more electrons than protons, giving it a net negative charge. This is important to the skin (membrane) which is the interface between the high frequency fields and biology containing iron molecules. "It is about skin resonance," said Oberfeld, "which is affected so that a very tiny amount of energy needed in order to have it formed in other way and it will produce free electrons. This effect is dependent on the field strength." Oberfeld explained that while the effect is dependent on time, ICNIRP recognizes an effect at 60 V/m yet scientists can see an effect at only 4 V/m. Citing the work of Martin L. Pall, PhD, Professor of Biochemistry and Basic Medical Sciences at Washington State University, Oberfeld gave credence to the NO / ONOO theory of how the same mechanism can account for people suffering the same condition present with different symptoms.

Scientific support for Oberfeld's explanation about extra ion and free radicals was produced last year by Malka N. Halgamuge at the University of Melbourne and Chaturika D. Abeyrathne at the University of Peradenya, Sri Lanka. In answer to concerns about possible adverse biological effects their paper, "Behavior of Charged Particles in a Biological Cell Exposed to AC-DC Electromagnetic Fields," nails it. They confirm that EMF affects ions and different signals and strengths have a resonant effect.

Further evidence comes from Örjan Hallberg, and brave, out-spoken Prof. Olle Johansson who note that EMF and our sleeping habits may contribute to an explosion in the rate of cancers. "A metal spring mattress is acting as a TV antenna and will definitely increase the

risk for standing waves and body currents that can disturb the immune system. Consequently, countries where such beds are less frequently used should be expected to show lower melanoma rates. Figure 16 reports on a review of bed standard and cancer in different areas of the world. Again, the data seems in favor of this hypothesis.” In effect we are being cooked - more slowly perhaps - but just as thoroughly as if we rest inside a microwave oven.

Oberfeld’s observation about skin resonance is supported by a U.S. Patent 6506148 application which outlines the methods of physical manipulation of television and computer screen viewers through skin resonance. Filed by Hendricus G. Loos of Laguna Beach, California, the abstract states, “Physiological effects have been observed in a human subject in response to stimulation of the skin with weak electromagnetic fields that are pulsed with certain frequencies near 1/2 Hz or 2.4 Hz, such as to excite a sensory resonance. Many computer monitors and TV tubes, when displaying pulsed images, emit pulsed electromagnetic fields of sufficient amplitudes to cause such excitation. It is therefore possible to manipulate the nervous system of a subject by pulsing images displayed on a nearby computer monitor or TV set. For the latter, the image pulsing may be imbedded in the program material, or it may be overlaid by modulating a video stream, either as an RF signal or as a video signal. The image displayed on a computer monitor may be pulsed effectively by a simple computer program. For certain monitors, pulsed electromagnetic fields capable of exciting sensory resonances in nearby subjects may be generated even as the displayed images are pulsed with subliminal intensity.”

Pall’s paper, "Unexplained Illnesses:Disease Paradigm for Chronic Fatigue Syndrome, Multiple Chemical Sensitivity, Fibromyalgia, Posttraumatic Stress Disorder, Gulf War Syndrome and Others" explains in greater detail the process beginning with the production of Super Oxide mentioned by Oberfeld who adds electromagnetic fields as a co-factor in the Super Oxide - ROS - Peroxynitrite process as well as the onset of Alzheimer’s disease in a vicious cycle. “There is evidence, for example, from power lines in Switzerland that those persons that live 50 mtrs both sides of the line, high voltage power lines, have an increased risk of Alzheimer which is dependent upon the length how long they have lived there,” said Oberfeld.

### **Alzheimer’s? - Don’t Forget Other Effects**

Other physical damage to the human organism attributable to ELF, radio and microwave exposure includes lipid peroxidation, protein damage, DNA strand breaks, inhibition of enzyme activity, disturbances in cell death, and disruption of the cell cycle. “Increasing evidence suggests,” said Oberfeld, “the participation of mitochondria in neurodegenerative and neuromuscular diseases involving alteration in both nuclear DNA and mtDNA.” Mitochondrial DNA (mtDNA) are called organelles. These are biological structures within certain cells that convert the chemical energy from food into a form that cells can use.

“I propose that its a biochemical mechanism and the mitochondria is especially overwhelmed with free electrons forming super oxide, forming peroxynitrite and this will also inhibit enzyme activity within the mitochondria, for example, with energy metabolism so the fatigue many people claim is from my point of view very well backed by this mechanism,” said Oberfeld.

Giving hope to sufferers, Oberfeld added, “We know when exposure is reduced people get better. The system can cope with that... a certain amount.”



Long term exposure is another matter where people have no escape is another matter. Communication masts, DECT telephones and wi-fi present omni-present sources of microradiation from which there is no relief or escape. Citing a French study by Roger Santini and others, Oberfeld noted a decrease in a range of symptoms the farther people lived from a sending mobile phone base station. The Santini group found a significant link between the distance to a mast and the incidence of headache: people living close to a phone mast had a headache much more often than people living more than 500 m away from it. Their report, however, was subject to criticism from the Dutch government because participants in the survey were aware of the purpose of the study and which could be reflected in a biased result.

Oberfeld noted the so-called “umbrella effect” saying, “There’s a very strong relationship with the distance to the mobile phone base station and the prevalence of certain symptoms like fatigue. As we can see, between 10 and 50 mtrs the prevalence is low and then there’s an increase (50 - 100 mtrs) and then there’s a decrease again. This might be due to the effect that mobile phone antennas will, usually in towns, will hit the next houses at those distances so if you are closer by the mobile phone mast it will radiate above your head so you are not that much affected.

A study by Oberfeld and Spanish colleagues in 2004 investigated the distribution of radiation from a large mast located on a mountain at La Ñora, Murcia, Spain, in the vicinity of two GSM 900/1800 MHz cellular phone base stations overlooking homes in the valley. A summary report on the research notes:

All models showed statistical significant associations between the measured electric field (~ 400 MHz - 3 Ghz) and 13 out of 16 health related symptoms. The strongest five association found are depressive tendency, fatigue, sleeping disorder, difficulty in concentration and cardiovascular problems. The symptoms associated are in line with the symptoms reported in the literature as “Microwave Syndrome”.

**- Oberfeld, Navarro, Portoles, Maestu, Gomez-Perretta**  
The Microwave Syndrome: Further  
Aspects of a Spanish Study

In support of his findings in Spain Oberfeld cited a study by Hans-Peter Hutter and his team at the Institute of Environmental Health at the Medical University of Vienna in Austria. Hutter reports “there was a significant relation of some symptoms to measured power density; this was highest for headaches.”

When it comes to standards, Oberfeld noted there is a huge difference between ICNIRP / WHO / EU and the standards recommended by the BioInitiative Report of 2007 in place in Oberfeld’s native Salzburg where the limit is 666 times lower than those recommended by government on the outside and nearly 2,000 lower inside buildings. (See chart.)

Oberfeld referred the audience to The Bioinitiative Report 2007 ([www.bioinitiative.org](http://www.bioinitiative.org)) which argues for a biologically-based exposure standard for electromagnetic radiation. Reading from the report’s frontispiece, Oberfeld said, “Both ELF and RF exposures can be considered genotoxic (will damage DNA) under certain conditions of exposure, including levels that are lower than existing safety limits. The clear consensus of the BioInitiative Working Group members is that the existing safety limits are inadequate for both ELF and RF.”

So compelling is the evidence of damage to the human organism, a paper by Prof. Magda Havas resulted in the City of San Francisco's decision to ban a proposed city-wide wi-fi network in direct confrontation with the wishes of powerful industries based in nearby Silicon Valley. The backlash was swift with the industry threatening to pull it's annual convention in the city that is recognized as the birthplace of the personal computer.

<b>General Public Electromagnetic Standards and Recommendations</b>		
<b>Standards and Guideline Values for Mobile Phone Base Stations</b>	<b>V/m</b>	<b><math>\mu\text{Wcm}^2</math></b>
ICNIRP / WHO / EU (all sources)	<b>40 - 60</b>	<b>435 - 950</b>
Switzerland (per Site)	<b>4 - 6</b>	<b>4.2 - 9.5</b>
Italy	<b>6</b>	<b>9.5</b>
South Tyrol	<b>3</b>	<b>2.4</b>
Bioinitiative 2007	<b>0.6</b>	<b>0.1</b>
Public Health Department Salzburg 2002		
Outdoors	<b>0.06</b>	<b>0.001</b>
Indoors	<b>0.02</b>	<b>0.0001</b>

### **Good News - Bad News. Are We Using the Ionisphere to Cook?**

Until countries are brought into agreement in terms of exposure, Oberfeld recommends that residents can protect themselves by purchasing metallic screened window glass, carbon paint, tin (or other metals) roofs, avoidance of sources of radiation such as DECT phones, wi-fi, and using cabled computers rather than wireless internet connections.

After speaking for an hour, Oberfeld began to tire but his eyes radiate enthusiasm for his subject. For the camera he offered the following:

“What is important to note is, when you are exposed to wi-fi it may last several months, several years that you don't experience any symptoms and your assumption is therefore 'This technology does not harm me.' Point: this is true but only at the first level. At the second level during those years or months you've just started affecting your body and it's a cumulative effect at the biochemical level. At a certain amount of exposure our body can cope with so there will be no problem. After a certain amount of time and exposure it's the dose, exposure times time is the dose, and the sensitivity of the individual which might be different from another one, symptoms appear.

“At this stage this person might be affected by other sources as well. For example, CFL bulbs, energy-saving bulbs, or the television set or the computer monitor or using a mobile phone, whatever. Then I say, 'Welcome to the club.' At this time the person awakens and says, 'Well yes, now I have a problem.' My answer is then, 'Okay, try to reduce the exposure.' That's the first thing and when your body gets free of those exposures it has the chance to come back to the balance again, to be healthy again. That's the good news.”

## More Bad News

CFL bulbs are also coming under fire - after they've been mandated by the EU and incandescent bulbs are no longer available - speaking to the *Daily Express* in the U.K. Andreas Kirchner of the Federation of German Engineers, said: "Electrical smog develops around these lamps. I, therefore, use them only very economically. They should not be used in unventilated areas and definitely not in the proximity of the head."

"But the bad news is however," said Oberfeld, "even if the amount of the exposure, if you are re-exposed, most of the people can recognize, 'Oh yes, here is something that's not good.' That's good. So the body is warning. Then the people have learned to avoid those exposures. I recommend that our society at a first step tries to be aware of these new technologies, to reduce personal and public exposure and on the second level we must try to find solutions. We need better technologies in order to serve the same needs."

His words were small comfort to those forced to leave the lecture and unheard by passers-by using cell phones on the footpath on the other side of the centre's Brandsma Room wall.

- **John Weigel**

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