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Electrosmog

Surrounding you every day are a huge variety of natural electromagnetic radiation from the earth and the sun that your body needs in order to survive. These sources have some unique characteristics in that if they are coherent (repetitive) they are either spatially coherent (always the same shape and size) or temporally coherent (always the same frequency), but never both. As such, are body happily absorbs what it needs and ignores the rest. However, man-made signals are both spatially and temporally coherent, and to these sources are body has an adverse reaction.

In science, the damaging (toxic) effects of ionizing radiation such as high-energy radiation in the form of X-rays, gamma rays and particle radiation as well as ultraviolet radiation (UV) are rather well understood, even at very low dosages. However, non-ionizing types of electromagnetic radiation such as radar radiation, radio (communication) frequency radiation (RF), laser rays as well as power frequency radiation, extremely low frequency (ELF) and static electric and magnetic fields can have detrimental biological effects at amazingly low exposure levels. This holds especially true for situations where low exposure levels are combined with long periods of exposure. Though this mechanism is often poorly understood, highly industrialized countries keep producing more and more emitters of non-ionizing radiation. Even at low levels this starts to add up and poses a risk for human health, which should not be underestimated. This new kind of pollution is referred to as "electromagnetic pollution" or "electrosmog."

Learn More – Help your family & friends

This is just a brief overview of the issues involved with Electrosmog. For a more comprehensive perspective, we highly recommend that you take the online course:

IBE 204.3 Electromagnetic Radiation

In our modern world, the rapid development and broad usage of electric and electronic equipment unfortunately stands in stark contrast to our limited knowledge base of radiation biology and all of its consequences. In a society, which acknowledges the human right to a life of dignity, preventive health care strategies and responsible actions for future generations should be at the top of the global health agenda. However, in the area of radiation biology, more health-centered research and holistic-minded specialists are needed not only to interpret the available data, but also above all to help create a safe and healthy living environment for everybody.

POWER FREQUENCY FIELDS

Scientific Background

In the course of evolution, all living organisms have adapted themselves to this very unique radiation climate prevalent on planet earth. This natural balance is being threatened now because over the last 100 years humans have been very busy adding their own versions of electromagnetic energies without giving due considerations to the biological implications.

The belief that low-level electric, magnetic and other electromagnetic fields, such as those emanating from electric home wiring systems and common appliances, have biological effects is an established scientific fact. The "only" question that remains is how great and how harmful those health effects are, especially in the long run.[1] Since technical advancements tend to develop much faster than the scientific research proving their safety or harmfulness, the following discussion is based on the motto: *Prevention is better than a cure!*

> "Electromagnetic Hypersensitivity (EHS) is characterized by a variety of non-specific symptoms, which afflicted individuals attribute to exposure to electromagnetic fields (EMF). The symptoms most commonly experienced include dermatological symptoms (redness, tingling, and burning sensations) as well as neurasthenic and vegetative symptoms (fatigue, tiredness, concentration difficulties, dizziness, nausea, heart palpitation, and digestive disturbances). The collection of symptoms is not part of any recognized syndrome.

[1] Becker, Robert O. *Cross Currents.* New York: Penguin Group (USA) Inc., 1990.

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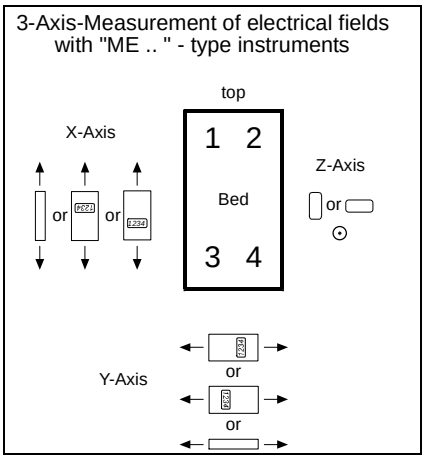
EHS resembles multiple chemical sensitivities (MCS), another disorder associated with low-level environmental exposures to chemicals. [2]

Any device that is at a higher potential than ground will emit an electric field. Picture this as a bunch of hair-like lines springing forth from the source in all directions. Anything or person between the source and the earth will be influenced by these lines. The human body functions on electricity; it is composed of conductive and semi-conductive materials, so that if it is exposed to a high electric field, a voltage will be induced that upsets the natural communications.[3]

Discovery

AC electric and magnetic fields occur wherever there is electricity. AC electric and magnetic fields are most commonly found in the vicinity of wiring — either running inside a wall or mounted on its surface, and especially around two-wire extension cords. It is worse when near high voltage transmission lines, but household appliances and wiring can also create problems. Most frequently it is the sleeping area where people unknowingly try to rest their tired heads against highly radiating walls that have the highest biological impact. The good news is that the field strength, and therefore health impact, decreases with distance.



Mark four points of measurement of one personal sleeping area on the bed, according to the following sketch. The outer positions of the sleeping area should be 60cm (2ft) apart in the Y-Axis and 180cm (6ft) apart in the X-Axis. For beds designed for two people, there should be two separate sleeping areas evaluated. The guidelines of the VDB "Verband deutscher Baubiologen" or "Association of German Building Biologists"[4] recommend 9 points but with the above procedure one can obtain all relevant information with dramatically reduced effort.

The sketch indicates the way the one-axis potential-free instrument that has the sensor in the direction of the longest side of the instrument has to be positioned in multiple directions in order to measure the three axes. Please note the alternative positions of the instrument for the same resulting reading. It can be rotated around the respective axis as well as its orientation can be turned by 180 degrees.

For best results there should be a 30cm (1ft) distance to conductive items if possible. An exception is of course the distance to the mattress where a distance of 5cm (2in) to achieve "lifelike" results. But note that, especially with spring-mattresses, there can be some inevitable distortions, which can be reduced if the distance is increased over 5cm (2in). Record the readings for all the locations.

For electric fields measurements, use the ungrounded (potential-free) instrument, i.e. NOT connected with the grounding wire, NOT held in the hand but placed on a non-conductive holder (preferable use dry wood or cardboard) or non-conductive handle of at least 1.5m (5ft). View the instruments reading from a distance of at least 1.5m (5ft). Place the instrument on the holder and rotate/move the holder accordingly.

Goal for Sleeping area: less than 1.5V/m for electric fields and less than 20nT for magnetic fields

Fixing the Problem

In those places where we spend most of our time, we should avoid exposure to power frequency fields. This is especially true for sleeping areas, when the human body is particularly vulnerable to external electromagnetic stressors. All wiring, lighting and electronic equipment in close proximity (within 6ft) to a person should ideally be shielded. If this is not feasible, it is highly recommended to cut off electric circuits and devices affecting the sleeping area.

[2] http://www.who.int/mediacentre/factsheets/fs296/en/ (World Health Organization)
[3] Oschman, James. *Energy Medicine.* London: Churchill Livingstone, 2000.
[4] Maes, Wolfgang, *Standard of Baubiologie Methods of Testing* (SBM-2003), 2003.

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HIGH FREQUENCY ELECTROMAGNETIC RADIATION

Scientific Background

This kind of field comes from radio, TV, police, fire, military communications, microwave, radar, and cellular phones. The energy level is billions of times stronger than the natural high frequency energies from the cosmos that existed during our biological development. Today, these energies are pervasive and can be measured everywhere on the earth. The wireless age is increasing the density of such energies at an unprecedented rate.

Research shows cataracts, blood composition changes, hormone alterations, and chromosomal abnormalities are induced at high frequency energies. The power levels involved were one hundredth of the standard now set by the US government. An Air Force study on rats in the early 80's showed stress induced reduction in immune system response and cancers of the pituitary, thyroid, and adrenal glands at a low ($0.5\mu W/cm^2$) energy level.[5] Research on close to the head pulsed digital wireless communications signals show them to increase non-malignant tumors of the auditory nerve, increase brain cancer, cause chromosomal damage and DNA breaks in brain tissue.[6]

The higher the frequency of the electromagnetic radiation, the more the electric and magnetic field components meld together. At these frequencies it becomes almost impossible to measure those fields as separate entities. We speak of electromagnetic waves or radio frequency radiation (RF).

Problems are these are often high exposure with a short distance (within 8 inches) to humans, such as with cell phones. When a signal is being transmitted between your phone and the tower, the signal strength requirement is dependent upon the distance and obstructions between the two. If more power is needed than the tower can provide for the "link," the cell phone power will increase to meet the requirements. Thus, the further you are away from the tower, the more power your phone will produce, and the more radiation will be transmitted into your head. However, be aware that all times your phone has RF output, it is just a matter of how much and how near it is to your head. It is known that 20-80% of the cell phone radiation is deposited into the head of the user, and that multiple individuals have reported ill effects from using cell phones.
Reference: http://microwavenews.com

Discovery

Primary household sources are: Short range wireless 25-300m (bluetooth, wireless internet, home automation) and 2.4 and 5GHz bands (portable and cell phones), as well as radio/TV towers.

External sources are cell towers and wi-fi systems. For assessment of RF exposure in a sleeping place not only does the actual bed need to be considered, but also a volume of about 1m (3ft) around and above it. Also the exposure from beneath the bed should be considered, even more so for wooden floors. This distance does not need to be measured exactly as this only a rough rule of thumb – there is no "official" and detailed recommendation for this, it is a rule derived from practical experience. With all of the internal devices turned off, using the RF Detector, scan the "cloud" around the bed.

Goal for sleeping area: Any indication of an external source is too much.

Fixing the Problem

Some general recommendations for avoidance are:

- Avoid living near broadcast and cell towers
- Stand clear of the front of your operating microwave oven
- Minimize cell phone usage - Use *air-flow* hands-free device
- Eliminate cordless phones that constantly transmit – use 900MHz analog phones
- Eliminate wireless connections – home automation, baby monitors (especially at night)
- Shield from external sources using fabrics, paints and other materials as suitable.

[5] *Cross Currents*, R.O. Becker, M.D., Jeremy Tarcher, Inc., 1990.
[6] http://microwavenews.com/fromthefield.html#10years?

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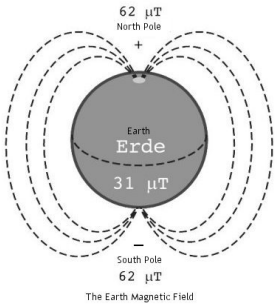
STATIC FIELDS

Scientific Background

Electrostatic and static magnetic fields (also called DC fields) occur in nature, where they can exist with enormous intensities. Since those fields do not vibrate at any frequency but are static, we also speak of electrostatic or magnetostatic fields. In general, these two fields are studied separately. However, both of them describe fields independent of time, that is, unchanging or static.

At the right dose, air electricity is essential for sustaining life. DC electric fields can cause more subtle health effects that are not obvious via a shock, and even subtler than the small shock when you touch a doorknob after walking across the carpet on a dry day. This has to do with the upsetting of the natural air ion balance and concentration by the presence of static electricity generating materials.

Primarily the health issue is one of depletion of the ions in general and the preponderance of positive ions in the remaining ions. Small air ions are biologically active and can effect the production of the powerful neurohormone seratonin. Tests show that positive ions increase the production of seratonin, while negative ions decrease it. This disruption of normal seratonin production has profound nerve, glandular and digestive effects. Positive ion excess has been shown to have three major effects: irritation and tension, exhaustion, and a hyperthyroid response. Common symptoms: dizziness, headaches, depression, anxiety, and a generally lower level of physical/mental function. Negative ion predominance has lead to elevated moods, high energy, and positive outlook. Other biological effects noted within high negative ion content: plants growing better, airborne bacteria and flu virus greatly diminished.



The Earth Magnetic Field

We are continually bathed in the earth's DC Magnetic Field. A "normal" field from the earth, geomagnetic, would be constant, unvarying due to molecular alignment with field lines going north and south about 600milliGauss in the far latitudes and 400milliGauss at the equator. However, there are many variations in strength and direction due to anomalies in the Earth and due to local influences, such as bedsprings and frames, rebar, steel or objects near the head like glasses and audio headsets. These anomalies in the natural constancy of amplitude and direction can have biological impacts, and are often referred to as *geopathic, i.e.,* Earth effects that have negative health impacts. (www.rolfgordon.com)

Discovery

Measurements can be made of the air ions directly. In general, the most straightforward approach to static electricity is elimination of offending materials, mainly replacing synthetic materials usually plastics, but includes synthetic carpets and furniture, with natural materials. It is worth paying special attention to the materials used for finishing floors, walls and furnishings because they cover large areas. The more electrically conductive they are, the better for the indoor climate. In most cases water-based varnishes are sufficiently conductive, oils and waxes, too. If in doubt, abstain from using finishes based on synthetics (e.g. acrylics or polyurethanes) but instead choose finishes made from natural materials such as lime, casein and linseed oil.

Move a liquid-filled compass through the living areas of interest, especially, the sleeping areas. Mapping is done of the areas where there are changes. The compass needle aligns itself with the horizontal field lines of the earth's magnetic field. The compass needs to be moved slowly and steadily along the length of the bed at several locations across the bed. Each deviation from magnetic north is one degree too much. The best situation is no deviation from north; however, this is difficult to achieve with about 50 or 60% of inner spring mattresses and most baby cribs.

Fixing the Problem

Some general recommendations for avoidance are:

- Sleep in a bed without metal
- Open windows to your home: the ionization of air is very important to mood and health.
- Sleep with your head to the North – in the northern hemisphere.

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RADON/RADIOACTIVITY

Scientific Background

Radioactivity is a characteristic inherent to certain types of atomic nuclei, which emit energetic particles (radiation) while transforming into a more stable form. The energy set free in the course of this process, also called radioactive decay, is emitted as an extremely energetic form of electromagnetic radiation (gamma radiation) and/or particle radiation (alpha particles, beta particles, neutrons).

Biological risks are also associated with small radiation doses through the accumulation effect over a long period of time. Short but high radiation doses seem to be better tolerated by the human organism than continuous but low radiation exposures. Biological effects of radioactivity are caused by its ionizing property. In medicine, a clear relationship has been established between an elevated radiation exposure and a higher incidence of cancer.

Natural background radiation originates from instable atomic nuclei within the earth's crust and from energetic charged particles out of the cosmic radiation showering down to earth. There are a great variety of radioactive elements, counting as many as 2,000 and more. They can be found in natural as well as artificial sources of radioactivity.

We distinguish between external as well as internal radiation exposures. External radiation exposure comes from sources outside our body, that is, cosmic radiation and radioactive terrestrial radiation. Internal radiation exposure occurs through the uptake of radioactive substances in our food and air. Depending on the altitude of a given place and its soil characteristics, natural radiation exposures can vary substantially.

Discovery

For building biology risk assessments comparative measurements with a Geiger counter are particularly well suited. This type of measurement gives the relation between the natural background radiation and the radioactivity emanating from within a home, a building material, a gadget as a deviation in percentages.

In order to establish the reference value of the natural background radiation, it is necessary to take several measurements at various spots (at least 3), diligently avoiding potential sources of radioactivity. For the analysis of building materials it is important to choose that place in the home or garden for which the lowest readings could be established.

Results are expressed in percentiles – where the value is calculated as follows:

(Indoor – avg. Outdoor) / Outdoor X 100 = percent change

Fixing the Problem

All radiation exposures should be As Low As Reasonably Attainable (ALARA principle). Even the smallest radiation exposure should be avoided. Any dose of radioactivity can cause damage. This holds especially true for continuous radiation exposures in sleeping areas, living spaces and work environments.

Before building or renovating, the level of radioactivity in building materials (ceramic tiles, bricks, plasters, etc.) and suspicious items should be determined by means of specific measurements. Only building materials and furnishings with the lowest readings should be selected. It is not recommended to build on a site with elevated radiation levels in the soil nor in such an environment (e.g. in close proximity to a nuclear power plant).

Radon can be reduced by ventilation, sealing the soil contact areas of the house and sub slab suction systems. The first method, ventilation, can be achieved by passive means such as opening windows, or by active methods such as heat exchanger ventilator systems. Sealing the basement, leaks or slab areas should be the first choice and can often obtain results.

Some general recommendations for avoidance are:

- Avoid the use of radioactive material – if planning to use something that might be radioactive, test it first to ensure it is not elevated from the background levels.
- Get a Radon test kit from your State/Provincial Radon office. If you can't get one from them, you can purchase one fairly inexpensively from a local home supply store. Use the EPA acceptance standard.

