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| **Disclaimer About Guidelines**  An important point to make is that a guideline limit is not a precise delineation between safety and hazard. There is no one level above which exposures become hazardous to health; instead, the potential risk to human health gradually increases with higher exposure levels (Sugarman). Guidelines indicate that, below a given threshold, electromagnetic field exposure is safe according to scientific knowledge. However, it does not automatically follow that, above the given limit, exposure is harmful. To be able to set limits on exposure, scientific studies need to identify the threshold level at which first health effects become apparent (Coghill). As humans cannot be used for experiments, guidelines critically rely on animal studies (WHO). Subtle behavioral changes in animals at low levels often precede more drastic changes in health at higher levels. Abnormal behavior is a very sensitive indicator of a biological response and has been selected as the lowest observable adverse health effect (EMR Alliance). Guidelines recommend the prevention of electromagnetic field exposure levels, at which behavioral changes become noticeable. This threshold level for behavior is not equal to the guideline limit. ICNIRP applies a safety factor of 10 to derive occupational exposure limits, and a factor of 50 to obtain the guideline value for the general public. Therefore, for example, in the radiofrequency and microwave frequency ranges, the maximum levels you might experience in the environment or in your home are at least 50 times lower than the threshold level at which first behavioral changes in animals become apparent (ICNIRP).  At present, speculations about potential long-term health effects cannot form the basis for the issuing of guidelines or standards. Adding up the results of all scientific studies, the overall weight of evidence does not indicate that electromagnetic fields cause long-term health effects such as cancer. National and international bodies set and update standards on the basis of the latest scientific knowledge to protect against known health effects. Guidelines are set for the average population and cannot directly address the requirements of a minority of potentially more sensitive people. Air pollution guidelines, for example, are not based on the special needs of asthmatics. Similarly, electromagnetic field guidelines are not designed to protect people from interference with implanted medical electronic devices such as heart pacemakers. Instead, advice about exposure situations to be avoided should be sought from the manufacturers and from the clinician implanting the device.  **How Accurate Are the Guidelines?**  The responsibility to investigate fields around power lines, mobile phone base stations or any other sources accessible to the general public lies with government agencies and local authorities. They must ensure that compliance with guidelines is maintained. With electronic devices, the manufacturer is responsible for complying with the standard limits. However, as we have seen above, the nature of most devices ensures that the emitted fields are well below the cut-off values (Sugarman). Furthermore, many consumer associations carry out tests on a regular basis. A regular question is "Are exposures above the guidelines harmful"? It is perfectly safe to eat food up to the expiration date, but if you consume the food any later the manufacturer cannot guarantee good food quality. Nevertheless, even a few weeks or months after the expiration date, it will usually be safe to eat the jam. Similarly, electromagnetic field guidelines ensure that, within the given exposure limit, no known adverse health effects will occur. A large safety factor is applied to the level known to cause a health consequence. Therefore, even if you experienced field strengths several times higher than the given limit value, your exposure would still be within this safety margin (Grant). In everyday situations, most people do not experience electromagnetic fields that exceed the guideline limits. Typical exposures are far below these values. However, there are occasions where a person's exposure may, for a short period, approach or even exceed the guidelines. According to ICNIRP, radiofrequency and microwave exposures should be averaged over time to address cumulative effects. The guidelines specify a time-averaging period of six minutes and short-term exposures above the limits are acceptable (ICNIRP). In contrast, exposure to low frequency electric and magnetic fields is not time-averaged in the guidelines. To make things even more complicated, another factor called coupling comes into play. Coupling refers to the interaction between the electric and magnetic fields and the exposed body (WHO). This depends on the size and shape of the body, the type of tissue and the orientation of the body relative to the field. Guidelines must be conservative: ICNIRP always assumes maximum coupling of the field to the exposed individual. Thus the guideline limits provide maximum protection. For example, even though the magnetic field values for hairdryers and electric shavers appear to exceed the recommended values, extremely weak coupling between the field and the head prevents the induction of electrical currents that could exceed guideline limits (WHO).  **The Future �**  The future rests in the hands of the WHO (World Health Organization), who conducts the most comprehensive research at this time. The main aim of WHO's International EMF Project is to initiate and coordinate research worldwide to produce a well-founded response to public concerns. This evaluation will integrate results from cellular, animal and human health studies to allow as comprehensive a health risk assessment as possible. A holistic assessment of a variety of relevant and reliable studies will provide the most reliable answer possible about the adverse health effects, if any exist, of exposure to electromagnetic fields.    ([Intro1](http://docs.google.com/introduction.html))([Intro2](http://docs.google.com/intro2.html))([Intro3](http://docs.google.com/intro3.html))([Intro4](http://docs.google.com/intro4.html))  [[Home](http://docs.google.com/home.html)][[Introduction](http://docs.google.com/introduction.html)][[Hypothesis](http://docs.google.com/hypothesis.html)][[Procedure](http://docs.google.com/procedure.html)][[Data](http://docs.google.com/data.html)][[Conclusions](http://docs.google.com/conclusions.html)][[Bilio/Links](http://docs.google.com/biblio.html)]  [[2002 Projects](http://docs.google.com/AP2002/index.html)][[2001 Projects](http://docs.google.com/index.html)][[2000 Projects](http://docs.google.com/AP2000/index.html)][[1999 Projects](http://docs.google.com/AP99/index.html)][[1998 Projects](http://docs.google.com/AP98/index.html)] |