

# ICNIRP exposure standards inappropriate - Better protection for citizens against radiation sought

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## Summary

We need to get rid of the current system of standards and limits for the protection of citizens against electromagnetic fields (EMF), as recommended by the *International Commission for Non-Ionizing Radiation Protection*, the ICNIRP. These limits for radio frequency fields are based solely on limiting warming of the body ("thermal effects") and limits for low frequency fields are based on a combination of physiological effects in the body. For both frequency ranges, the limits are several orders of magnitude too high. Under normal living conditions, the field strengths experienced do not come close to these limits, while people do experience nuisance and develop "electrostress phenomena. So there are also "non-thermal effects", but ICNIRP denies their existence. Therefore, better standards should be developed that also protect electro-sensitive people against (weak) EMF at home or at work.

We propose to abandon ICNIRP guidelines for citizens and adopt instead the limits of the physician organization EUROPAEM, for the time being. But ideally, we should develop new standards based on physiological criteria. Physical responses to incident EMF are diverse and complex and it is important to set up a 'think tank' with specialists in relevant biological disciplines to investigate the possibilities for biological standards. Realistic exposure limits for the electrosensitives should be the outcome.

## ICNIRP standards and limits in disrepute

The Netherlands applies the ICNIRP Guidelines on limits for exposure to electromagnetic fields (EMF)<sup>1</sup>. With regard to the radio frequency (RF) fields, the heat-generating capacity of these fields is acknowledged: the so-called "thermal effect". In practice, however, health problems among the citizens arise at field strengths (far) below those limits. They are "non-thermal effects" that do not generate heat, but do cause physiological disturbances that can cause electrical stress complaints. ICNIRP has never seriously looked for sensitive biological markers that cause these effects, or accepted that these effects can occur when exposed to field strengths below the set limits. This is disturbing because such effects have existed for many years and are well documented<sup>2</sup>. There are other countries that have adopted much lower limits on their own authority, but The Netherlands intends to stick to the ICNIRP guidelines and considers to introduce them in law<sup>3</sup>.

It must be remembered that it is risky to put our safety in the hands of the private organization ICNIRP. The organizational structure, objectives, ambitions and working methods are unclear and are not under democratic control. The remarkable choice and method of evaluation of scientific articles evokes discussion<sup>4</sup>.



ICNIRP denies that EMFs with strengths below exposure limits can have physiological effects on humans. That is factually incorrect. ICNIRP has no right to speak of "non-thermal" effects and new guidelines must be drawn up for this.

## Nuisance from electromagnetic fields (EMF)

There is a subpopulation of people worldwide who suffer from short-term exposure to weak EMF's and develop symptoms of electrohypersensitivity (EHS)<sup>5</sup>. There is also a notable increase in neurodegenerative problems, especially in The Netherlands (2nd place in the list of countries)<sup>6</sup>, which is attributed to the strong increase in EMFs of varying frequencies in the environment.

ICNIRP denies the relationship between weak EMV and health problems. As a result, protective measures by the government must wait.

People suffer from EHS to varying degrees. The most common complaints are chronic fatigue, sleep and concentration problems, headache, ringing in the ears, rash and many derivative problems. In Sweden, 1.5% of the inhabitants of Stockholm belong to the group of electrosensitives <sup>8</sup>. In Holland, the *Kantar study* <sup>9</sup>, which was commissioned by the *Knowledge platform EMF and health*, reports that 3% of 628 adult respondents indicate that "... actually noticed something physically or has been affected by electromagnetic radiation. The most frequently mentioned symptoms are fatigue, difficulty concentrating and headaches". In a comparable representative study by the *National institute for public health and the environment* (RIVM) among even larger groups of citizens, 7% of the average respondents reported a degree of EMF nuisance <sup>10</sup>. GPs are gradually starting to recognize the EHS problem, as shown by a scientific study by RIVM <sup>11</sup>. One of our GP's elaborates on the EHS problems in a YouTube video <sup>12</sup>.

An Austrian association of general practitioners has previously issued *guidelines* for the treatment of people with EHS <sup>13</sup> as well as the *European academy for environmental medicine* (EUROPAEM) <sup>14</sup>. Barnes and Greenebaum consider EHS to be accepted as a fact and should be studied in considerable detail <sup>15</sup>.

### History of the high exposure limits

During the Cold War, mid-20th century, the radar industry emerged in the USA to detect enemy aircraft <sup>16</sup>. The more powerful those radars became, the further they could "look". But the soldiers on duty on the warships were literally warmed up by the powerful radars, leading to cancer from which they died. Thus, restrictions were placed on the strength of the EMF in areas where crews were allowed to stay. The Institute of electronic and electrical engineers (IEEE) <sup>15</sup> had been invited to suggest exposure limits, be it only on the basis of thermal effects of the radiation. That limit became 10 mW / cm<sup>2</sup> (= 100W / m<sup>2</sup>) (note: the current ICNIRP limit is lower: 10 W / m<sup>2</sup>, but still much too high).

The limits established by the IEEE and ICNIRP are similar, yet differ due to differences in assumptions. So there is room for discussion and relevance of circumstantial evidence. Indeed, many countries draw up their own plans <sup>16</sup>.

### ICNIRP's progress

ICNIRP apparently has the ambition to have their model for risk assessment of EMF accepted in Europe and beyond, probably in order to promote the benefits of the electronic industry. This is done, among other things, by making standards ("*Guidelines*"), and by making board members available to the WHO, the Dutch Health Council, the RIVM, the GGD / GHOR, the EMV & Health Knowledge Platform. All organizations speak with the same tongue here: "only EMF exposure above the ICNIRP exposure limits can cause nuisance." Comparable health organizations in other countries enjoy personnel "reinforcements" from ICNIRP, such as Switzerland, Norway, Sweden and Japan <sup>18</sup>. The term "cartel" has been coined by the magazine *Investigate Europe* because ICNIRP has suspiciously many formal connections <sup>19</sup>. The question is why The Netherlands actually adhere to the ICNIRP system and does not come up with relevant security measures which really protect the EMF-sensitive people.

### ICNIRP's updated Guidelines

In 1998 ICNIRP released the *Guidelines for limiting exposure to electromagnetic fields (100 kHz - 300 GHz)* and after more than 20 years it was time for an update. In the last 2 years, the scientific community has been invited to make improvements for the planned revision <sup>20</sup>, and many took advantage of this opportunity to suggest the adoption of lower exposure limits. This year (2020), the final version was completed <sup>21</sup>. However, the limits were largely maintained. Only the body 'extremities' such as head, arms, legs and skin were now allowed to be exposed to a higher EMF dose, because the relatively larger surface area would give a stronger cooling after tissue were heated up <sup>22</sup>.

The thermal effects have remained; the non-thermal effects category was denied and no special adjustments were made to the developments of 5G networks. Long-term exposures, pulsed fields, cumulative effects of high and low frequency fields have also not or hardly been taken into account. Even the specific behavior of millimeter waves in the skin, the likely harmful effects on subcutaneous tissues, with associated general health complaints, did not receive any special consideration.

### **ICNIRP's exposure limits are unrealistic for citizens**

The proposed exposure limits are unrealistically high, as people are not nearly exposed to such high field strengths in their daily lives, yet experienced significant health complaints. Measures to reduce exposure by increasing the distance to sources, or by technical measures to block EMF's invading their premises, reduce complaints effectively. Examples: (1) for 4G transmitter fields there is a formal limit of 61 V / m, while people on the street rarely experience values as high as 3V / m, and at home only 1V / m <sup>23</sup>. For low-frequency magnetic ELF fields of 50 Hz, the limit is set at about 200  $\mu$ T; we prefer to keep the magnetic field below 20 nT, as people feel much better at these – or lower – values. For electric fields the limit is about 5 kV / m. In the living/working situations, the electric field strengths usually is below 1 V / m <sup>24</sup>. Field reduction helps EHS complaints in all cases.

In addition to the *Guidelines* for exposure to radio frequency EMF, ICNIRP also publishes guidelines for lower frequency ranges 1Hz - 100 kHz <sup>25</sup>. For both frequency ranges, the strength of the external fields is meant by ICNIRP to ensure that the integrity of the body is not disturbed.

Obviously, there is a wide discrepancy between limits set by ICNIRP and the experiences of electrosensitive people. Only field intensities several orders of magnitude below ICNIRP limits are acceptable for those sensitives, although personal variations remain.

### **Develop more realistic standards and limits**

There are countries that apply up to a thousand times sharper limits to protect against radio frequency fields, such as Russia, China, France, Belgium, Switzerland and others <sup>16 18</sup>. The big difference is that their health organizations also take into account the patient's pre-existing complaints. Precisely those syndromes that are not clinically objectifiable have been considered in their assessment.

Several organizations have made proposals to lower the ICNIRP limits, including the BioInitiative Project <sup>26</sup>, the Seletun Statement <sup>27</sup>, the Council of Europe <sup>34</sup>, the European Academy of Environmental Medicine (EUROPAEM) <sup>14</sup> and others. EUROPAEM suggests the most detailed proposals on limits for low and high frequency fields, based on literature data and subjective health reports. The proposed limits are all orders of magnitude below those of the ICNIRP.

The German *Wolfgang Maes* organization goes even further, producing its guidelines from data from thousands of people with EHS and their methods for reducing their own field exposure levels. Field reduction measures that can get them back on their feet. Their *Standard Baubiologische Messtechnik (SBM-2015)* guidelines <sup>28</sup> are widely used in Europe.

In almost every environment there is a complex mixture of field types. EHS sufferers seeking advice require the deployment of qualified technical engineers to take good measurements and make proposals for field reduction <sup>29</sup>. People with EHS often need coaching afterwards for their reintegration into society <sup>30</sup>.

In short, the EUROPAEM system seems to be a useful alternative system of EMF standardization, although refinements with the aid of the SBM2015 can serve the people with extreme sensitivity.

### **Polarization between defenders and rejectors of non-thermal EMF effects**

In an interview with our national newspaper *De Telegraaf* <sup>31</sup>, professor Hans Kromhout, chairman of the EMV committee of the Health Council, expressed his heart about irreconcilable positions of representatives of electro-sensitive persons towards deniers of EMV damage to health. Some points that were addressed:

- ... the lack of assessment of possible 5G hazards conflicts with the very critical way we deal with exposure to other types of hazards in the environment
- ... the US NTP study provided evidence for the relationship between RF EMF exposures and cancer

in mice and rats

- ... "special" that ICNIRP standards have gained so much power in Europe; just looking at heating of tissues is not enough
- ... the ICNIRP is a somewhat opaque club, it has no independent status
- ... there is only one standard for 5G: heating. No room for other health effects. "You shouldn't just let the industry go its own way."

The problem is that at the request of the House of Representatives, the Council must submit a position before the summer on the risks of 5G. In the same Council, as secretary, Dr. Eric van Rongen, who is also the current chairman of the ICNIRP board. It is interesting to hear what advice the Health Council will send to the House.

### **Identifying EMF effects as a basis for EHS diagnosis and exposure limits**

As explained earlier by me <sup>32</sup>, the EMF effects on the body can be distinguished in stages. The 'cascade model' assumes a relationship between place / time of primary impact and the nervous system. From there, a further processing of the stimulus is carried out. The brain integrates all signals, assesses possible dangers and activates defense mechanisms to combat threats via nervous actions, the hormonal and immune systems. EHS symptoms are generated when the stimuli are not recognized as 'normal'.

It is important to identify the "measurable" aspects of that stimulus trajectory. It is about developing an objectifiable biological model (physiological, molecular, genetic) in order to be converted into practical diagnose tools for physicians and MDs. Particular attention should be paid to non-invasive techniques that can be performed in the doctor's office or in clinical laboratories. Of course, there are tclinical differences between sensitive and control persons in the composition of bodily fluids <sup>33</sup>. But there are more biochemical and physiological types of effects that should be made available for diagnosing the EHS condition <sup>15</sup>. Barnes and Greenebaum in the USA also advocate further biological research to design better guidelines and present an action plan for that purpose <sup>15</sup>.

### **Open discussion between experts on what to do next**

It is time to promote discussions among experts in the field of EMF to give substance to the wish for demonstrability of the EHS condition. The search is for a person or organization who wants to put their weight behind it. Why not the Dutch *Knowledge Platform for EMF and health*? Perhaps a heavy-weight scientist or organizer with a broad profile might advocate such a discourse and set up a broad study under the auspices of our national science organization, ZonMW, for example.

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The present blog can be retrieved [here](#).

For a list of quoted references, some of them in Dutch, click [here](#).

For previous blogs, see <https://www.hugoschooneveld.nl/inhoud/links.php>

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