



July 17, 2007

Dr. Maria Neira, Director
Public Health and Environment
World Health Organization
Geneva, Switzerland
(via email)

Re: Letter of Comment on WHO ELF Health Criteria Monograph
and WHO Fact Sheet No. 322.

Dear Dr. Neira,

This letter of comment is submitted on the WHO ELF Health Criteria Monograph and accompanying WHO Fact Sheet. We understand that the Report and Fact Sheet have already been presented as completed documents (WHO ELF Workshop, June 20-21st, 2007 in Geneva). However, we urge your attention to some deficiencies that will undermine public and scientific confidence in the two documents as presented; and to offer what we hope are constructive observations and criticisms for your consideration.

Taken together, the workshop proceedings, the Report and the Fact Sheet make the following points:

- 1) Very low risk and only for childhood leukemia.
- 2) No attributable risks are estimated for other childhood cancers (so warrants no expensive ELF grid changes).
- 3) Dismisses as “inadequate” the evidence for all adult cancers, miscarriage, and neurological diseases.
- 4) Exonerates ELF-EMF as a possible cause of breast cancer and cardiovascular disease.
- 3) Says “no known mechanism”.
- 4) Precautionary action is warranted (but very little)
- 5) Fact Sheet says “policies based on the adoption of arbitrary low exposure limits are not warranted” but the Report does not so state.
- 6) The Task Group is silent on the sufficiency of the existing ICNIRP standards with respect to chronic exposure.
- 7) Let each country decide what to do.



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We urge you revise the Fact Sheet. Bluntly stating that “adoption of numeric planning guidelines is unwarranted” is inconsistent with the Monograph, is inconsistent with letting each country decide proportionate responses, and will create a patchwork of differing approaches. It frustrates those who have no benchmark to compare their mitigation strategies against, nor their success in achieving them. It ties the hands of governments that wish to give more specific guidance based on the levels of EMF consistently associated with increased risk of childhood leukemia. It looks like a “last minute add-on” to placate industry interests, one of whom as a presenter in your workshop opined all that is necessary is to “control the process – don’t worry about controlling the message”. We believe this advisory against adopting numeric guidelines is one measure of the success of that strategy.

a) The Fact Sheet should be amended to delete “policies based on the adoption of arbitrary low exposure limits are not warranted”.

b) The attributable fraction of childhood leukemias related to ELF-EMF exposure is underestimated, taking into consideration other credible, higher estimates including Milham, 2001 and Exhibit 1 (attached). The Report itself says that other childhood cancers cannot be ruled out (Monograph, page 256) so discussing reasonable responses to the problem should not just be based on the leukemia numbers alone.

c) The scientific research community does not find the scientific evidence for other childhood cancers, adult cancers, Alzheimers disease, ALS, miscarriage and neurological diseases to be inadequate (California Department of Health Services EMF Program Report, 2002; SAGE Report, 2007).

d) Estimates of attributable risk for those diseases which are still considered possibly related to ELF-EMF exposures at very low, environmental levels when taken together should be included in this report.

e) The Report states there are no known mechanisms by which ELF-EMF may be biologically active, leading to disease endpoints. Yet, plausible mechanisms are widely published and discussed in the relevant literature, This incorrect assertion should be corrected in the Report, and Fact Sheet. It is true there is no proven mechanism (but there does not have to be a proven mechanism to take meaningful precautionary action).



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f) A stronger effort should be recommended by WHO to encourage countries to develop their own plans to contend with this larger potential health issue.

Key principles of your own presentation at the WHO workshop underscored the importance of letting each country choose its own proportionate response to public health issues, according to their country-specific disease profiles, resources and public health mandates. Countries that every year see children die from intestinal diseases might choose to address better sanitation and water; while US and European countries that do not lose a single child each year to intestinal diseases but do have substantial childhood leukemia concerns may reasonably be expected to direct their available resources proportionately to reducing ELF-EMF risks to children.

Underplaying the scientific evidence for potential ELF-EMF health risks because not all countries may have the resources or desire to address them in the same manner will unfairly handicap those nations who wish to move ahead. WHO should refrain from giving specific “guidance” against setting interim numeric limits or planning targets. Some countries may feel that it is prudent to set interim ELF-EMF targets where the evidence based on increased risk of childhood leukemia with chronic exposures at 0.2 – 0.4 uT is widely accepted, for example in the siting and design of new or upgraded transmission lines, or child-oriented toys and appliances.

We deeply appreciate your concerns on this matter, and thank you for your efforts to balance the guidance that WHO gives to its world-wide audience.

Respectfully submitted,

CL Sage, Sage Associates, Santa Barbara, CA USA
S. Milham, MD, Olympia, Washington USA
N Evans, Health Science Consultant, San Francisco USA

cc: Drs. Emilie Van Deventer. Christopher Portier

Exhibit 1 – Childhood Leukemia and EMF by Samuel Milham

An inescapable fact is that the incidence of childhood leukemia varies by at least a factor of 10 around the world. from about 5/100,000 to about 0.4/100,000 The highest rates are in electrified places and the lowest are in places in the third world with no or low levels of electrification. Historically, the age 2-4 peak of the major leukemia of childhood, cALL, didn't appear until the 1920's, and in the US tracks the spread of residential electrification from urban to rural areas. The TEL/AML1 chromosomal translocation which is associated with cALL has very low levels in third world places compared to industrialised places.

I think that the low risk ratios found in leukemia EMF studies is due to exposed controls and bad exposure assessment. The true unexposed controls occur only in the third world, and all of the studies to date are comparing more exposed cases to less exposed controls. Using Doll and Hill's lung cancer/ cigarette smoking data, comparing 2 pack a day smokers to one pack a day smokers gives risk ratios of 2-3 while comparing 2 pack a day smokers with non-smokers gives risk ratios above 20. In the industrialized world, there are no non-exposed EMF controls.

Exposure assessment is also severely flawed in most of these studies. The major leukemias of childhood have their origin in-utero. None of the studies look preferentially at maternal exposures during the index pregnancy. Most of the measurement based studies use meters limited to the power-frequencies. A pregnant woman driving to work gets more ELF EMF exposure in her car in 1 hour than in 24 hours at home, and none of it is captured by Emdex type meters because of the low frequencies. Transients and higher frequencies are also ignored.

With suitable controls and complete exposure assessment, I predict that EMF/ childhood leukemia risk ratios will be above 10, and attributable risks will be above 60%.

Milham S, Ossiander EM. 2001. Historical evidence that residential electrification caused the emergence of the childhood leukemia peak. Med Hypotheses 56(3):290-5 Washington State Department of Health, Olympia, Washington, USA. smilham2@comcast.net