



Submission to Health Canada on Public Consultation on Safety Code 6

July 11 2014

**Michael Kruse
Jason Locklin, B.Sc., M.A.
Gem Newman, B.Sc.
Rob Tarzwell, M.D., FRCPC**



Safety Code 6

Bad Science Watch

Bad Science Watch is an independent Canadian consumer protection organization dedicated to promoting good science in public policy.

The following was prepared by volunteers and represents what we believe to be an honest, fair, and science-based evaluation. We are an independent body that is funded by private donations and we do not represent any corporate interests.

We can be contacted as follows:

Bad Science Watch
180 Danforth Ave. P.O. Box 35024
Toronto, ON, M4K 3P5
www.badsciencewatch.ca
info@badsciencewatch.ca
888.742.3299 voice
888.813.3569 fax



Safety Code 6

Introduction

Please find below our brief summation of the scientific evidence for Idiopathic Environmental Intolerance attributed to Electromagnetic Fields, referred to colloquially as Electromagnetic Hypersensitivity. This evidence is distilled from both our original research for a white paper in 2012 and our science advisor Dr. Rob Tarzwell's presentation to the Royal Society in the fall of 2013.

Scientific Evidence

Our primary concern is the preponderance of flawed and poorly controlled studies on the subject of idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF, sometimes called EHS). Because a likely explanation for IEI-EMF is that it is psychogenic, experiments testing the effects of EM fields on IEI-EMF which lack sufficient blinding are simply unable to provide valuable answers. Bad Science Watch is very pleased to see that Health Canada took study quality very seriously, and included in their references systematic reviews by Rubin et al (2005), Rösli (2008), and Rubin et al (2010).

We would also recommend that the 2011 systematic review of the physiological effects of EMF exposure by Rubin et al be included in your references to reinforce your findings. This review found no reliable evidence suggesting that those who identify as "electromagnetically hypersensitive" experience any unusual physiological reactions when exposed to electromagnetic fields.

Systematic reviews of the evidence for EMF as the causal agent for symptoms of IEI-EMF have found no evidence that exposure to EMF can provoke these symptoms. Systematic reviews of treatments for IEI-EMF have shown that the only intervention to have a measurable effect in relieving symptoms of IEI-EMF is cognitive behavioral therapy. This points toward a primarily psychogenic etiology (Baliatsas et al 2012, 2011, Frei et al 2012, Genius and Lipp 2012, Kwon et al 2012, Nieto-Hernandez et al 2008, Schröttner et al 2007, Witthöft and Rubin, 2011).

The idea that exposure to radiofrequency electromagnetic fields within the proposed limits poses a threat to human health is not supported by the available evidence and is scientifically implausible. The literature that purports to show a connection between 1 GHz EMF and changes in brain perfusion or metabolism are mixed and not substantial enough to draw conclusions about its effect on humans (Davis and Balzano 2011, Kwon 2011, Mori and Arendash 2011, Volkow 2011).

References

Baliatsas, C., Kamp, I.V., Lebret, E., and Rubin, G.J. (2012). Idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF): A systematic review of identifying criteria. *BMC Public Health* 12, 643.



Safety Code 6

Baliatsas, C., van Kamp, I., Kelfkens, G., Schipper, M., Bolte, J., Yzermans, J., and Lebret, E. (2011). Non-specific physical symptoms in relation to actual and perceived proximity to mobile phone base stations and powerlines. *BMC Public Health* 11, 421.

Davis, C.C., and Balzano, Q. (2011). Cell Phone Activation and Brain Glucose Metabolism. *JAMA: The Journal of the American Medical Association* 305, 2066–2067.

Genuis, S.J., and Lipp, C.T. (2012). Electromagnetic hypersensitivity: fact or fiction? *Sci. Total Environ.* 414, 103–112.

Frei, P., Mohler, E., Braun-Fahrlander, C., Fröhlich, J., Neubauer, G., and Rössli, M. (2012). Cohort study on the effects of everyday life radio frequency electromagnetic field exposure on non-specific symptoms and tinnitus. *Environment International* 38, 29–36.

Kwon, M.K., Kim, S.K., Koo, J.M., Choi, J.Y., and Kim, D.W. (2012). EHS subjects do not perceive RF EMF emitted from smart phones better than non-EHS subjects. In *2012 Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pp. 2190–2193.

Kwon, M.S., Vorobyev, V., Kännälä, S., and Laine, M. (2011). GSM mobile phone radiation suppresses brain glucose metabolism. *Journal of Cerebral Blood Flow and Metabolism* 31, 2293.

Mori, T., and Arendash, G.W. (2011). Long-Term Electromagnetic Field Treatment Increases Brain Neuronal Activity: Linkage to Cognitive Benefit and Therapeutic Implications for Alzheimer's Disease. *J Alzheimers Dis* 1, 1–4.

Nieto-Hernandez, R., Rubin, G.J., Cleare, A.J., and Weinman, J.A. (2008). Can evidence change belief? Reported mobile phone sensitivity following individual feedback of an inability to discriminate active from sham signals. *Journal of Psychosomatic Research* 65, 453.

Rössli, M. (2008). Radiofrequency electromagnetic field exposure and non-specific symptoms of ill health: A systematic review. *Environmental Research* 107, 277–287.

Rubin, G., Hillert, L., Nieto-Hernandez, R., Van Rongen, E., & Oftedal, G. (2011). Do people with idiopathic environmental intolerance attributed to electromagnetic fields display physiological effects when exposed to electromagnetic fields? A systematic review of provocation studies. *Bioelectromagnetics* 32, 593–609.

Rubin, G., Das Munshi, J., & Wessely, S. (2005). Electromagnetic Hypersensitivity: A Systematic Review of Provocation Studies. *Psychosomatic Medicine* 67, 224–232.



Safety Code 6

Rubin, G., Nieto-Hernandez, R., & Wessely, S. (2010). Idiopathic environmental intolerance attributed to electromagnetic fields (formerly "electromagnetic hypersensitivity"): An updated systematic review of provocation studies. *Bioelectromagnetics* 31, 1–11.

Schröttner, J., Leitgeb, N., and Hillert, L. (2007). Investigation of electric current perception thresholds of different EHS groups. *Bioelectromagnetics* 28, 208–213.

Volkow ND, Tomasi D, Wang G, and et al (2011). Effects of cell phone radiofrequency signal exposure on brain glucose metabolism. *JAMA* 305, 808–813.

Witthöft, M., and Rubin, G.J. (2013). Are media warnings about the adverse health effects of modern life self-fulfilling? An experimental study on idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF). *Journal of Psychosomatic Research* 74, 206–212.