



# Electromagnetic Hypersensitivity

Lena Hedendahl\*, Michael Carlberg, Lennart Hardell,  
Department of Oncology, University Hospital, Örebro Sweden

## Abstract

There is a long history to the disease Electromagnetic Hypersensitivity (EHS) consisting of symptoms such as: headaches, nausea, dizziness, skin problems (itching, pricking, and heating), heart arrhythmias, concentration and memory difficulties, sleep problems, aches in muscles and joints etc. In the 1980s, symptoms from cathode ray tube computer screens appeared among office workers, most of whom were women. They showed symptoms that included flushing, burning, and tingling in the skin, especially on the face. When it worsened, they could develop eczema and swollen faces, with dilated blood vessels and vesicles, which was usually diagnosed as Rosacea. In Sweden, Björn Lagerholm, a dermatologist found a similarity between skin biopsies of these women and heavily UV-radiated skin tissue. Later studies determined that the results may not have been entirely due to the Radio Frequency-Electromagnetic Fields (RF-EMF).

## 1 Background

The reference values determined by the International Commission on Non-Ionizing Radiation Protection in 1998 were recommended to be  $2-10 W/m^2$  for frequencies between 10MHz and 300 GHz. These levels are to protect against heating injuries of  $1^\circ C$  after 30 minutes of exposure. Injuries caused by other biological mechanisms are not believed to exist: however, many other countries have adopted lower values of  $0.1 W/m^2$ . The BioInitiative Report in 2012 has even suggested that  $3 \mu W/m^2$  as a reference value due to research indicating that as little as  $30 \mu W/m^2$  have shown biological effects.

## 2 Wi-Fi In Schools

The growing concern is that children may be at a greater risk of exposure due to their smaller body sizes and continued growth potential. As well as the over-exposure due to an increased amount of RF-EMF in schools as Wi-Fi becomes a standard in all classrooms combined with the growing use of handheld devices. In Sweden, there have been a growing number of students reporting symptoms of EHS. Many studies have

been completed using provocation study and have different findings, determining that there are possibly too many variables to control. The case studies of various EHS's in schools reported similar symptoms to those in the military radar working areas.

## 3 Conclusions

Many countries governments do not recognize EHS as an illness or impairment and do not give any support. Both extremely low frequency and RF-EMF have been evaluated by the International Agency for Research on Cancer at the World Health Organization as being "possibly" carcinogenic (Group 2B). These conclusions seemed to have little to no impact on the regulatory bodies for reducing human exposure. Those being exposed, such as children in schools, are not informed of the possible issues they may be facing due to overexposure. The situation in schools with growing exposure to RF-EMF is hard to understand and defend for medical reasons, long term health effects are unknown. There appears to be an increase in EHS as an increased exposure to RF-EMF becomes more unavoidable with growing technologies. Measure-



ment procedures should be performed in schools during a typical school week. This should lead to a precautionary approach using wired solutions for internet connection, to consider RF-EMF as an environmental pollutant that needs to be controlled and limited.

## References

- [1] L. Hedendahl, M. Carlberg, and L. Hardell. Electromagnetic hypersensitivity - an increasing challenge to the medical profession. *Reviews on environmental health*, 30, 09 2015.