

Reykjavik Appeal on wireless technology in schools

We, the signers, are concerned about our children's health and development in schools with wireless technology for teaching. A vast amount of scientific studies have shown considerable medical risks with long-term exposure to Radiofrequency Radiation (RFR) from wireless devices and networks well below the recommended reference levels from the International Commission on Non-Ionizing Radiation Protection (ICNIRP). We ask the authorities to take their responsibility for our children's future health and wellbeing.

In May 2011 the International Agency for Research on Cancer (IARC) at WHO classified RFR as a Group 2B carcinogen, i.e., 'possibly' carcinogenic to humans. Since then more scientific studies on exposure to RFR in humans, animals and biological material have strengthened the association of an increased risk for cancer, especially brain tumors. Several laboratory studies have shown mechanistic effects in carcinogenesis such as oxidative stress, down regulation of mRNA and DNA damage with single strand breaks. The IARC cancer classification includes all sources of RFR. The exposure from mobile phone base stations, Wi-Fi access points, smart phones, laptops and tablets can be long-term, sometimes around the clock, both at home and at school. For children this risk may be accentuated because of a cumulative effect during a long lifetime use. Developing and immature cells can also be more sensitive to exposure to RFR. Based on scientific studies no safe level of this radiation has been established and therefore we have no safety assurances.

Besides the cancer risk, RFR may also affect the blood-brain barrier to open and let toxic molecules into the brain, hurt neurons in hippocampus (the brain centre for memory), down or up regulate essential proteins in the brain engaged in the brain's metabolism, stress response and neuro-protection and affect neurotransmitters. Sperms exposed to Wi-Fi have been seen with more head defects and DNA damage. RFR can increase oxidative stress in cells and lead to increase of pro-inflammatory cytokines and lower capacity to repair DNA single and double strand breaks.

Cognitive impairments in learning and memory have also been shown. Results from the OECD's PISA performance surveys in reading and mathematics show decreasing results in countries that have invested most in introducing computers in school. Multitasking, too many hours in front of a screen, less time for social contacts and physical activities with risk for aches in neck and back, overweight, sleep problems, and information technology (IT)-addiction are some of the known risks and side effects of IT. They stand in marked contrast to the often claimed, but largely unproven possible benefits.

We ask the school authorities in all countries to acquire knowledge about the potential risks of RFR for growing and developing children. Supporting wired educational technologies is a safer solution than potentially hazardous exposures from wireless radiation. We ask you to follow the ALARA (As Low As Reasonably Achievable) principle and Council of Europe Resolution 1815 to take all reasonable measures to reduce exposure to RFR.

Practical rules for schools concerning children and wireless technology.

- No wireless networks in preschool, kindergarten and schools.
- A hard wired direct cable connection is recommended to each classroom for the teacher to use during lessons.
- Prefer wired telephones for personnel in preschool, kindergarten and schools.
- Prefer cabled connection to Internet and printers in schools and turn off Wi-Fi settings in all equipment
- Prefer laptops and tablets that can be connected by cable to Internet.
- Students should not be allowed to use cell phones in schools. They can either leave them at home or the teacher collects them in turned off mode before first lesson in the morning.

Children, Screen time and Wireless Radiation – International Conference
Reykjavik February 24, 2017

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Appendix for further reading.

References

- Akdag MZ, Dasdag S, Canturk F, Karabulut D, Caner Y and Adalier N: Does prolonged radiofrequency radiation emitted from Wi-Fi devices induce DNA damage in various tissues of rats? *J Chem Neuroanat* 2016, doi: 10.1016/j.jchemneu.2016.01.003.
- BioInitiative Working Group: BioInitiative 2012. A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF). Sage C and Carpenter DO (eds.). Bioinitiative, 2012. Available online: <http://www.bioinitiative.org/table-of-contents/>
- Buchner K and Eger H: Changes of clinically important neurotransmitters under the influence of modulated RF fields—A long-term study under real-life conditions [Original study in German]. *Umwelt-Medizin-Gesellschaft*. 2011;24:44-57.
- Calvente I, Pérez-Lobato R, Núñez MI, Ramos R, Guxens M, Villalba J et al. Does exposure to environmental electromagnetic fields cause cognitive and behavioral effects in 10-year-old boys? *Bioelectromagnetics*. 2016;37:25-36.
- Council of Europe (2011). Résolution 1815 (2011): The potential dangers of electromagnetic fields and their effect on the environment. <http://assembly.coe.int/nw/xml/XRef/Xref-XML2HTML-en.asp?fileid=17994&>
- Coureau G, Bouvier G, Lebailly P, Fabbro-Peray P, Gruber A, Leffondre K, et al. Mobile phone use and brain tumours in the Cerenat case-control study. *Occup Environ Med*. 2014;71:514-522.
- Dasdag S, Akdag MZ, Erdal ME, Erdal N, Ay OI, Ay ME, Yilmaz SG, Tasdelen B and Yegin K: Effects of 2.4 GHz radiofrequency radiation emitted from Wi-Fi equipment on microRNA expression in brain tissue. *Int J Radiat Biol*. 2015;91:555-61.
- Deshmukh PS, Nasare N, Megha K, Banerjee BD, Ahmed RS, Singh D, Abegaonkar MP, Tripathi AK and Mediratta PK: Cognitive impairment and neurogenotoxic effects in rats exposed to low-intensity microwave radiation. *Int J Toxicol*. 2015;34:284-90.
- Hardell L, Carlberg M. Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors associated with use of mobile and cordless phones. *Rev Environ Health*. 2013;28:97-106.
- Hardell L, Carlberg M. Mobile phone and cordless phone use and the risk for glioma – Analysis of pooled case-control studies in Sweden, 1997-2003 and 2007-2009. *Pathophysiology*. 2015;22:1-13.
- Hedendahl L, Carlberg M, Hardell L. Electromagnetic hypersensitivity - an increasing challenge to the medical profession. *Rev Environ Health*. 2015;30:209-315.
- Hensinger P. Big data: a paradigm shift in education from personal autonomy to conditioning toward excessive consumerism. *Umwelt-Medizin-Gesellschaft*. 2015;28:206-13.
- Fragopoulou A, Samara A, Antonelou MH, Xanthopoulou A, Papadopoulou A, Vougas K, Koutsogiannopoulou E, Anastasiadou E, Stravopodis DJ, Tsangaris GT, et al: Brain proteome response following whole body exposure of mice to mobile phone or wireless DECT base radiation. *Electromagn Biol Med*. 2012;31:250-74.
- IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 102. Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields. International Agency for Research on

Cancer: Lyon, France, 2013. Available online:

<http://monographs.iarc.fr/ENG/Monographs/vol102/mono102.pdf>.

ICNIRP. Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). International commission on non-ionizing radiation protection. *Health Phys.* 1998;74(4):494-522.

Markovà E, Malmgren LO and Belyaev IY: Microwaves from mobile phones inhibit 53BP1 focus formation in human stem cells more strongly than in differentiated cells: Possible mechanistic link to cancer risk. *Environ Health Perspect.* 2010;118:394-9.

Megha K, Deshmukh PS, Banerjee BD, Tripathi AK, Ahmed R, Abegaonkar MP. Low intensity microwave radiation induced oxidative stress, inflammatory response and DNA damage in rat brain. *Neurotoxicology.* 2015;51:158-65.

Nittby H, Brun A, Eberhardt J, Malmgren L, Persson BR and Salford LG: Increased blood-brain barrier permeability in mammalian brain 7 days after exposure to the radiation from a GSM-900 mobile phone. *Pathophysiology.* 2009;16:103-12.

OECD (2015). *Students, Computers and Learning: Making the Connection*, PISA, OECD Publishing. Available at: <http://dx.doi.org/10.1787/9789264239555-en>.

Sangün Ö, Dünder B, Çömlekçi S, Büyükgebiz A. The effects of electromagnetic field on the endocrine system in children and adolescents. *Pediatr Endocrinol Rev.* 2015;13(2):531-45.

Spitzer M. Information technology in education: Risks and side effects. *Trends in Neuroscience and Education* 2014;3:81-5.

Wyde M, Cesta M, Blystone C, Elmore S, Foster P, Hooth M, Kissling G, Malarkey D, Sills R, Stout M, et al: Report of Partial Findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats (Whole Body Exposures). Draft 5-19-2016. US National Toxicology Program (NTP), 2016. doi: <http://dx.doi.org/10.1101/055699>. Available online: <http://biorxiv.org/content/biorxiv/early/2016/05/26/055699.full.pdf>

Yakymenko I, Tsybulin O, Sidorik E, Henshel D, Kyrylenko O, Kyrylenko S. Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. *Electromagn Biol Med.* 2016;35:186-202.