WiFi radiation in schools:

Teachers and employers

1. WiFi radiation: a cancer agent

(a) WiFi radiation, like the radiation from iPads and mobile phones, was classified as a 2B possible cancer agent by the World Health Organisation's International Agency for Research on Cancer (IARC) in 2011.
(b) Since 2011 the scientific evidence for radio frequency as a human carcinogen has increased. Some leading scientists think that there is now sufficient evidence for radio frequency to be classified as a 2A probable, or class 1 certain, cancer agent. Some class 1 certain cancer agents started as 2B possible. The WHO's IARC may not review radio frequency again until 2021.
(c) There is a difference in length of exposure between WiFi and some other 2B substances like DDT and coffee (urinary bladder cancer). There is no choice over constant exposure from WiFi radiation in a school, whereas teachers are not forced to use DDT or drink coffee constantly during all their time in school.
(d) An increasing number of teachers and others attribute their cancer to exposure to WiFi radiation.

2. Unions against class 1, 2A and 2B cancer agents like WiFi radiation

Most unions in the UK and elsewhere ask that employers should not use class 1, 2A or 2B cancer agents where an alternative is available. For internet and data access, it is easy to provide wired or cable connections.

- "All occupational cancers are avoidable. Where possible that should mean removing carcinogens from the workplace completely, by changing the process or substituting the carcinogen with another material"
  (TUC: *Health and Safety: Time for Change*, 2013, p.7)
- Carcinogens Categories 1 and 2 should be labelled with "Toxic" symbol and R45 "may cause cancer"; safety representatives should "approach their employers seeking a commitment to remove exposure to all known or suspected carcinogens"; "the employer provides a written assurance that no substances classified as IARC Group 1, Group 2a or Group 2b carcinogens are used at the employer's undertaking"; "where these substances are in use, the employer will take all possible steps to eliminate the substance in question"
  (*Unite Guidance on Cancer at Work*, Unite Health and Safety Unit, issue 1, 2009, p.3)
- "the installation of WiFi microwave transmitters … may present a potential Health and Safety risk or hazard in the workplace"
  (OECTA: *A position regarding the use of Non-Ionizing Electromagnetic Radiation, including WiFi, in the workplace*, 2012, p.7)

3. WiFi radiation: other medical and neurological effects, especially for pregnant women and people with intolerance and/or genetic variations

(a) Radio frequency radiation, as from WiFi, iPads and mobile phones, has teratological effects. Studies show that pregnant women exposed to higher levels of mobile phone radiation are more likely to have children with neurological deficits like ADHD; no similar studies have yet been done for WiFi radiation, although in a classroom WiFi radiation can be higher than for a mobile phone.
(b) Radio frequency radiation, as from WiFi, iPads and mobile phones, has immediate cognitive effects for some people, according to scientific studies.
(c) Radio frequency radiation, as from WiFi, iPads and mobile phones, has adverse effects on male fertility, according to 80% of relevant medical studies, although the duration of these effects is not yet firmly established.
(d) Some 3-5% of the population is affected by an intolerance to radio frequency radiation, according to studies, with a variety of conscious symptoms, such as tiredness, sleep disturbance, heart effects, headaches, etc. (Nordic Council of Ministers (2000): ICD (International Classification of Diseases)-10.R.68.8; or Austrian Medical Council (2012): ICD-10.Z58.4). Professor Belpomme, a leading researcher at ARTAC (Association Reserche Thérapeutique Anti-Cancéreuse) in Paris, estimates that, depending on the rate of increase in man-made radio frequency radiation, some 10-50% of the population will develop this intolerance or electro-sensitivity by the years 2035-2060.
(e) Growing numbers of teachers and other workers in the UK and abroad have developed this intolerance to WiFi radiation and thus have become unable to work in an environment with WiFi or similar radiation. Nevertheless employers have a duty of care towards employees disadvantaged by an environmental functional disability under the UN Convention on the Rights of Persons with Disabilities of 2007 and the Equality Act of 2010.

Notes

(i) The UK government's thermal limits protect against heating, not against biological effects

The current (2012) advice from the Department of Health and PHE/HPA, that there is "no consistent evidence" ("no evidence", up to 2008) of harm to "the general population", depends on the claim that the only effect on humans from radio frequency radiation is heating. Thus the UK government's current safety levels protect only against a one degree increase in body heat for a young healthy adult male averaged over six minutes. These limits are not designed to protect teachers against non-thermal effects of low-level and long-term exposure, nor do they apply to teachers with compromised immune systems or genetic variations, nor to women teachers who are pregnant.

(ii) Most authorities now reject the UK government's heating-only claim and argue for adopting biological limits

The USSR adopted biological limits in 1958 and an increasing number of countries have done so since, most recently India in 2013. Since 2008 the majority of involved scientists have accepted non-thermal effects. In 2009 the EU parliament voted that current heating-only limits were "obsolete" and new biological limits were needed. In 2011 the Council of Europe warned governments against WiFi in schools. The international BioInitiative Report of 2012 by 29 experts proposed new biological limits

(see table below), as did the Seletun panel in 2010. The UK government has not yet accepted this majority scientific viewpoint based on the weight of established evidence.

(iii) ICNIRP advised governments to adopt non-thermal limits to protect vulnerable people

In 2002 the ICNIRP (International Commission on Non-Ionising Radiation) warned governments that vulnerable people, such as the sick, elderly and children, would need non-thermal limits below its heating-only limits. The UK government has not yet complied with this advice. There are likely to be teachers with compromised immune systems or genetic variations who are also more vulnerable to the current high levels of radiation from WiFi and similar devices, and pregnant women teachers may be especially vulnerable.

(iv) Scientific studies on ill health from WiFi radiation

WiFi standards were adopted in the year 2000. There have been no long-term studies on the health of effects of WiFi, therefore, since brain tumours can apparently take up to 30-40 years to develop, and early-onset Alzheimer's, another risk from electromagnetic exposure, may become apparent only after several decades of exposure. It may also be difficult in future to find sufficiently unexposed populations to use as controls. About 80% of short-term studies show negative health effects, mainly in the areas of fertility and cognitive effects. The UK government at present still claims that all conscious ill health from radiation is psychological, but this hypothesis fails to accept non-thermal objective scientific markers such as cerebral blood perfusion. Leading international experts have criticised this approach of the UK's Department of Health, Public Health England and its AGNIR as following "pseudo science" and failing to recognise idiopathic, non-linear biological reactions to environmental electromagnetic exposure.

(v) Removal of WiFi radiation for acute health problems and medical protocols

WiFi has been removed from some places where employees have realised that the WiFi radiation was the cause of their ill health. This happened, for instance, from 2008 in Paris in public libraries and several university libraries. All doctors involved in treating this condition emphasise the removal of the source of radiation as the key first step in addressing acute health problems. Protocols and guidelines for diagnosis and treatment are available from the Austrian Medical Association (2012) and the Centre for Electromagnetic Safety in Russia (2010). Although military personnel use silvered netting for protection against similar radiation in electronic warfare, it is usually impractical for teachers and other school employees to wear such protective suits.

(vi) WiFi radiation and children

Children, like the elderly and those with weakened immune systems or genetic variations, are especially vulnerable to bio-effects from radio frequency radiation at non-thermal levels. Studies on the effects of radiation from mobile phones show that people starting to use a mobile as teenagers are up to five times more likely to have brain tumours than those starting later. Therefore authorities in countries like Belgium, France, Germany, Israel and Russia warn against or ban the use of WiFi or mobile phones in some schools or for children.

(vii) Legal implications

In recent years cases have been won in Australia, Italy and the UK where employees have been harmed by, or lost their job because of, non-thermal radiation from WiFi,

cordless phones and mobile phones and where these radiation devices have been used at their place of work. Some insurers are now said to be refusing cover for electromagnetic risks because of the known non-thermal harm, and the UK banks are said to be strengthening their reserves for the time when class actions become common, based on the financial impact on the Lloyds insurance market in the 1990s following litigation over asbestos in the 1970s. Unlike mobile phone frequencies, WiFi frequencies are deregulated and thus each school and school governor as employer should undertake their own risk assessment since they appear liable for any harm caused.

(viii) Measurements of levels of WiFi radiation

Measuring WiFi radiation is difficult because it not only has the 2.45 GHz or 5 GHz carrier frequency but it also uses a low 10 Hz pulse. In addition it has a much greater amplitude than many mobile phone signals. The type of pulse and its amplitude seem to be especially bio-active, according to some studies. See the table below for some current non-thermal limits.

(ix) Table showing non-thermal limits (2013)

Safety limits (biological) for electro-magnetic exposure relevant to Teachers' exposure to WiFi radiation in schools †

Field	Unit	Limit	Authority	
power density	microwatt/metre^2	3*	children, ill people	BioInitiative 2012
		6*	healthy adults	
electric (radio frequency)	milliVolt/metre	194*	BioInitiative 2007	
	Volt/metre	0.19*		
electric (power frequency) potential free	Volt/metre	1.5	'severe concern', Building Biology Standard (7th edition), SBM-2008 ‡	
electric (power frequency) ground potential	Volt/metre	5.0	'severe concern', Building Biology Standard (7th edition), SBM-2008 ‡	
magnetic	nanoTesla	100*	BioInitiative 2007, Seletun 2010	

† All these fields are class 2B possible cancer agents.
** Some people are adversely affected at levels below these biological limits.*
‡ Supplement to Standard of Building Biology Testing Methods SBM-2008 (7th edition, 2008) for sleeping areas: suited to schools with residential accommodation; 'severe' is unacceptable and requiring remediation.

References:

(a) Unions

- TUC: *Health and Safety: Time for Change*, 2013: https://www.tuc.org.uk/sites/default/files/tucfiles/TUC_Health_and_Safety_Manifesto_Time_for_Change.pdf
- *Unite Guidance on Cancer at Work*, Unite Health and Safety Unit, issue 1, 2009: http://www.unitetheunion.org/uploaded/documents/Cancer%20at%20Work%20(Unite%20guidance)11-5327.pdf
- Ontario English Catholic Teachers Association: "A position regarding the use of Non-Ionizing Electromagnetic Radiation, including WiFi, in the workplace" (2012): http://www.oecta.on.ca/wps/wcm/connect/6a665c0049fedbee85919db62552ca8d/WiFipositionpaper2.pdf?MOD=AJPERES

(b) Bio-effects of WiFi radiation and biological limits

- Scientific papers (WiFi in Schools, UK): http://wifiinschools.org.uk/30.html *(details in section (f))*
- Scientific evidence (WiFi in Schools, USA): http://wifiinschools.com/science.html
- BioInitiative Report (2012): http://www.bioinitiative.org/ (pdf, 24 MB): http://www.bioinitiative.org/report/wp-content/uploads/pdfs/BioInitiativeReport2012.pdf
- Building Biology Standards (2008): http://hbelc.org/pdf/standards/sbm2008.pdf

(c) Medical protocols for the diagnosis and treatment of illness from WiFi and similar radiation

- Austrian Medical Association: *Guideline of the Austrian Medical Association for the diagnosis and treatment of EMF-related health problems and illnesses (EMF syndrome),* (2012): http://freiburger-appell-2012.info/media/EMF%20Guideline%20OAK-AG%20%202012%2003%2003.pdf
- Dr O. Grigoriev, Centre for Electromagnetic Safety, Russia: *Health and EMF Exposure: Protocol for Diagnostic and Therapy* (2010): http://www.radiationresearch.org/pdfs/20100111_grigoriev_presentation.pdf

(d) Videos on WiFi radiation effects (children and general)

- Australia, "Safe & Smart 4 r kids", 9 mins, 2013: http://www.wifi-in-schools-australia.org/ or http://www.youtube.com/watch?v=GJPTzaNkcUk
- Australia, "WiFi in Schools – The Facts", 18 mins, 2012: http://www.youtube.com/watch?v=kmcAXZ-o1K4
- Dr Magda Havas: "Wi-Fi in schools is safe. True or false?", 14mins, 2011: http://www.youtube.com/watch?v=6v75sKAUFdc
- Canadian news report, 14 mins, 2010: http://www.youtube.com/watch?v=KN7VetsCR2I

(e) Websites on WiFi radiation health effects in schools (mainly about children)

- Australia: http://www.wifi-in-schools-australia.org/
- Australia: https://www.facebook.com/ParentsAgainstWiFiinSchool
- Canada: http://www.schoolradiation.com/
- Canada: http://www.safeschool.ca/Home.html_script_src__http_.html
- UK: http://wifiinschools.org.uk/
- UK: http://ssita.org.uk/
- UK: http://www.cavisoc.org.uk/Health-Dangers-of-WiFi-in-schools.html
- USA: http://www.wifiinschools.com/index.html

(f) Some studies on adverse health effects from WiFi radiation

From: WiFi in Schools, UK: http://wifiinschools.org.uk/30.html
First pages, for printing: http://wifiinschools.org.uk/resources/Wi-Fi+papers.pdf

Papers listed are only those where exposures were 16V/m or below. Someone using a WiFi-enabled tablet computer can be exposed to electromagnetic fields up to 16V/m. Papers are in alphabetical order.

Atasoy H.I. et al., 2013. Immunohistopathologic demonstration of deleterious effects on growing rat testes of radiofrequency waves emitted from conventional Wi-Fi devices. *Journal of Pediatric Urology* 9(2): 223-229. http://www.ncbi.nlm.nih.gov/pubmed/22465825

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Aynali G. et al., 2013. Modulation of wireless (2.45 GHz)-induced oxidative toxicity in laryngotracheal mucosa of rat by melatonin. *Eur Arch Otorhinolaryngol* 270(5): 1695-1700. http://www.ncbi.nlm.nih.gov/pubmed/23479077

Gumral N. et al., 2009. Effects of selenium and L-carnitine on oxidative stress in blood of rat induced by 2.45-GHz radiation from wireless devices. *Biol Trace Elem Res.* 132(1-3): 153-163. http://www.ncbi.nlm.nih.gov/pubmed/19396408

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