

Concerns over Wi-Fi and mobile phone use in schools

The purpose of this document is to outline concerns over the use of mobile communications and Wi-Fi in schools and the scientific data on which these concerns are based.

Mobile/smart phones, Wi-Fi - enabled technologies and their base stations/routers emit modulated radio frequency signals in the microwave band of the electromagnetic spectrum.

There are many hundreds of scientific papers/reports showing biological effects of radiofrequency electromagnetic fields (EMFs). Moreover, children are considered at greater risk from exposure to EMF as they absorb more radiation into their brains, bone marrow and muscles and their bodies and brains are still developing.

Most of the research to date has focused on mobile phones, and adverse findings have led to precautionary measures in a growing number of countries, for example:

- Mobile phones now carry a health warning in Israel: "Warning - the Health Ministry cautions that heavy use and carrying the device next to the body may increase the risk of cancer, especially among children."
- France has imposed a ban on all mobile phones in schools and advertising targeted at children.
- UK Department of Health advise that under-16s should minimise mobile phone use and only use for essential purposes and keep all calls short.
- A clinical trial has been initiated to investigate if there is a link between the increasing rate of brain tumour occurrence in children and mobile phone use (<http://www.coeh.monash.org/mobikids.html>).
- Mobile manufactures are also advising use of hand-free and to keep devices away from the body (for Oncologist report and case study see <http://www.youtube.com/watch?v=BJib5GHxOsE>).
- On 19th October 2012 it was reported that Italy's Supreme Court has ruled that a man's brain tumour was caused by his use of mobile and cordless phones.

This data is relevant to Wi-Fi because although exposure from Wi-Fi devices is likely to be lower than from mobile phones, Wi-Fi in schools exposes children to microwave radiation 6 hours a day, 5 days a week, year after year.

For Wi-Fi specifically, very few studies have been conducted to date. Of the 7 studies we are aware of, 3 have reported no adverse effect on pre- and postnatal development in rats/mice but 4 studies have found alterations in brain function and decreases in male fertility, including in humans:

- Atasoy H.I. et al. (2012) Immunohistopathologic demonstration of deleterious effects on growing rat testes of radiofrequency waves emitted from conventional Wi-Fi devices. Journal of Pediatric Urology [Epub ahead of print]. <http://www.ncbi.nlm.nih.gov/pubmed/22465825>
- Avendaño C. et al. (2012) Use of laptop computers connected to internet through Wi-Fi decreases human sperm motility and increases sperm DNA fragmentation. Fertility and Sterility 97(1): 39-45. <http://www.ncbi.nlm.nih.gov/pubmed/22112647>
- Papageorgiou C.C. et al. (2011) found that both the electrical activity and attention level in young men was reduced in the presence of Wi-Fi. Journal of Integrative Neuroscience 10(2): 189-202. <http://www.ncbi.nlm.nih.gov/pubmed/21714138>
- Maganioti A.E. et al. (2010) observed that the EEG activity in young women exposed to Wi-Fi radiation was altered during a cognitive skill tests <http://www.istanbul.edu.tr/6internatwshopbioeffemf/cd/pdf/poster/WI-FI%20ELECTROMAGNETIC%20FIELDS%20EXERT%20GENDER.pdf>

In summary, Wi-Fi exposes users to lower electromagnetic field strengths than mobile phones do but the studies described above demonstrate that signals from Wi-Fi transmitters are still able to influence normal human physiology.

In addition, in 2007 the BBC Panorama programme (<http://www.pamt.co.uk/index.html>, abridged 8 minute version) showed that Wi-Fi transmitters in schools expose children to similar or more radiation than a mobile phone mast near the school. Therefore, looking at the data for base stations may also be relevant to assessing risks posed by Wi-Fi in schools. Of 22 published research papers in peer-reviewed journals into the health effects from proximity to mobile phone base stations on humans:

- 4 assessed cancer, 3 of which found a statistically significant increase in cancer from exposure.
- Of 19 looking at biological symptoms, 14 found an adverse association.

Science is the basis of medicine and findings such as those above as well as symptom reports from physicians have led several medical associations and individual doctors to express concern and recommend caution with regards to mobile phones and Wi-Fi, particularly for children, and many support the use of hard-wired systems in schools:

- Austrian Medical Association
- American Academy of Environmental Medicine
- International Society of Doctors for the Environment
- Irish Doctors Environmental Association
- Swiss Doctors for Environmental Protection
- International Children with Cancer 2012 conference several speakers were concerned about the possibility that wireless phones could be causing brain tumours in children [now leading cancer killer < 40 years old]. Several speakers supported EMF as Class 2A [probably carcinogenic to humans]
- International Doctors Appeal 2012: physicians say: "Today we as physicians and scientists call again on the international community. We are deeply concerned. Despite all warnings, more and more new wireless technologies are introduced into our daily lives ... All of these wireless technologies interfere with the biophysical organization of life with increasing layers and densities of electromagnetic fields." (<http://freiburger-appell-2012.info/en/home.php?lang=EN>)

For full details please refer to Safe Schools Report 2012:

(<http://www.wifiinschools.org.uk/resources/safeschools2012.pdf>)

Globally there is also a concern at government/public health level:

- In May 2012, World Health Organisation classified radio frequency radiation from all wireless communication technologies as a possible human carcinogen.
- On the 27th May 2011 the Parliamentary Assembly of the Council of Europe called on European member states to reduce exposures to radio frequency electromagnetic fields, particularly of children. The Council calls for schools to use wired internet connections and to strictly restrict the use of mobile phones by pupils.
- European Environment Agency: All reasonable measures to be taken to reduce exposure to electromagnetic fields ... particular exposures to children ... current exposure limits to be reconsidered.
- Switzerland's Federal Office of Public Health [FOPH] website states "It is currently not known whether the EMF created by WLANs pose a health risk".
- The Federal Government of Germany recommends avoiding the use of Wi-Fi and called for wired computer connections to be used.
- Israeli ministers have called for schools to use wired networks.
- The Public Health Department of Salzburg has warned that Wi-Fi should not be installed in schools.
- International Commission for Electromagnetic Safety [ICEMS] strongly advise limited use of cell phones and other similar devices by young children and teenagers.

As to how this relates to the UK, in April 2012 the Health Protection Agency (HPA) published an advisory report entitled "Health Effects from Radiofrequency Electromagnetic Fields" which concluded "there is no convincing evidence that radiofrequency field exposure below internationally agreed guideline levels causes health effects in

adult or children". This report has been widely criticised, e.g. Professor Dariusz Leszczynski (Finnish Radiation Protection Agency) commented "Unlike the claims on HPA website the UK HPA AGNIR Report 2012 is not a comprehensive review but it is a biased review".

From our own review, there are numerous reference to studies which have found harmful effects and yet these are not referenced in the conclusion e.g. Page 86: Cellular studies- " ...there are also studies ... did show potential genotoxic effects... a clear answer is still elusive".

Moreover, the HPA recognises that the possibility of harm remains:

- Professor Anthony Swerdlow, chair of the HPA's Advisory Group which prepared the report, has said: "Long term effects from childhood use are also largely unknown".
- HPA recommend a precautionary approach.
- Finally, none of the aforementioned papers of Wi-Fi adverse effects are cited in the HPA report as the cut-off date for papers was Dec 2010.

Shortly after the HPA report was issued the equivalent body in Russia (presumably looking at the same data) came to a very different conclusion (in June 2012), namely:

Recommend the usage of wired networks in schools and educational institutions, rather than a network using wireless broadband systems, including Wi-Fi.

Furthermore, on 3rd Oct 2012 The American Academy of Environmental Medicine issued following statement on Wi-Fi in Schools:

Adverse health effects from wireless radio frequency fields, such as learning disabilities, altered immune responses, and headaches, clearly exist and are well documented in the scientific literature. Safer technology, such as use of hard-wiring, is strongly recommended in schools.

Conclusion:

Whilst it may be argued that the data presented does not conclusively prove that mobile phones and Wi-Fi are harmful to health; it does conclusively show that the issue is hotly debated amongst scientists and research is split. Given the damaging effects reported it cannot yet be concluded that Wi-Fi or mobile phones are safe, therefore we are concerned if this represents a potential and unquantified risk for children.

With this in mind, we ask that schools take a precautionary approach (please see below) with regular review until it is categorically proven that Wi-Fi and mobile communications are safe. We believe that this approach best supports the responsibility schools have to provide a safe environment for all children whilst in their care.

Precautionary Principle:

"The precautionary principle applies where scientific evidence is insufficient, inconclusive or uncertain and preliminary scientific evaluation indicates that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the high level of protection chosen." (From the European Commission communication on the precautionary principle).