

WiredChild - <http://www.wiredchild.org>

wiredchild
PROTECTING OUR CHILDREN FROM WIRELESS TECHNOLOGY

- Home
- For parents
- For schools
- For children

We all enjoy the convenience mobile technology gives us but there may be serious health risks, especially for children.

WiredChild will help you reduce the risks from using mobile phones, cordless phones, wi-fi and other wireless products.

What can you do?
Simple steps to protect your child >>

Did you know?

- UK Chief Medical Officers' advice: children under 16 should not use mobile phones except for short essential calls >>
- The French government is banning advertising of mobile phones to children >>
- All the independently-funded scientific studies of longer term mobile phone use have found an increased risk of brain tumours >>

The Glow
★★★★★

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Dig deeper...

- Mobile and Cordless phones: the dangers >>
- Wireless technology: the dangers >>
- Our children as guinea pigs >>

Smoke - you can see

IT, innovation in education, and WiFi in schools – is there a risk to health?

The logo for Powerwatch, featuring the word "Powerwatch" in a white, sans-serif font against a blue background. The background of the slide also features a faint image of power lines and a grid pattern.

Powerwatch

<http://www.powerwatch.org.uk>

Hand Held Learning 2009

IT and Innovation in Education Does WiFi in schools pose a health risk?

Graham Philips
Technical Manager
Powerwatch UK

IT and learning, practical innovation

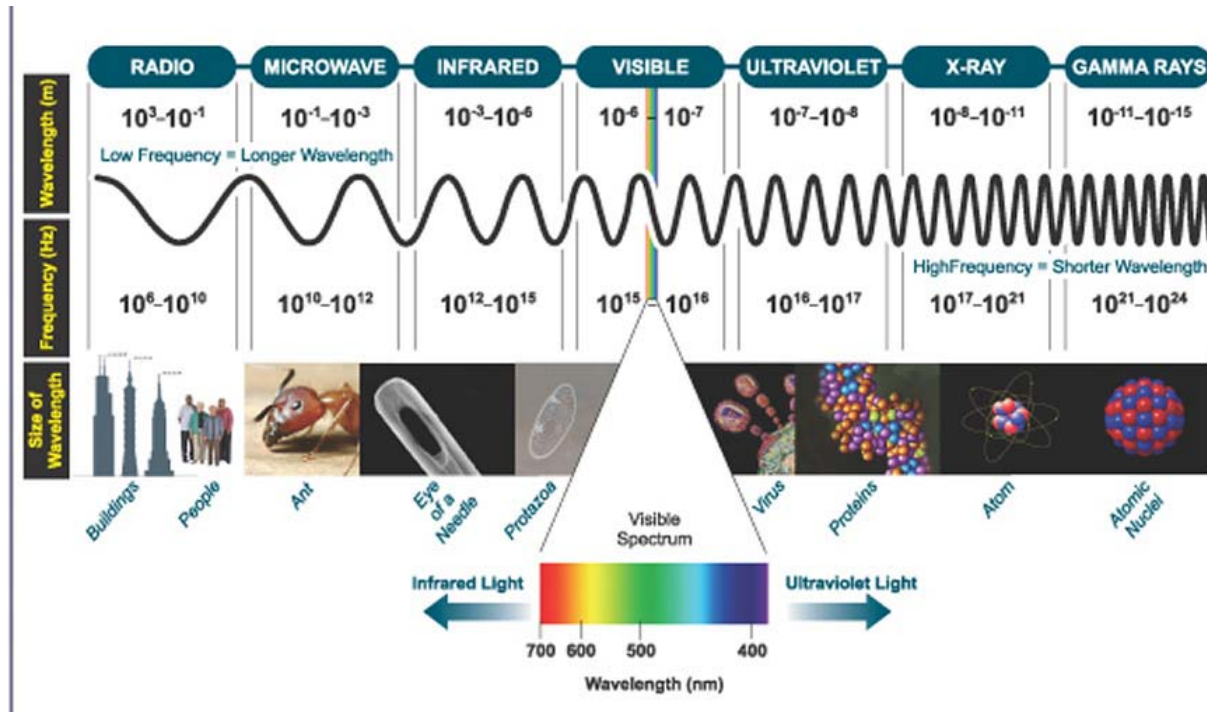
IT offers a lot to society and the economy through video games and other electronic consumer items that there is a high public interest for, but...

An even bigger benefit from correctly implemented IT services is improved efficiency, improved performance and reduced costs.

Education is a primary area where this is possible:

- Access to internet learning resources
- Collaborative documents and projects
- Marking and analysis of results
- Pupil teacher interactivity and communication, even out of lessons

The EMF Spectrum

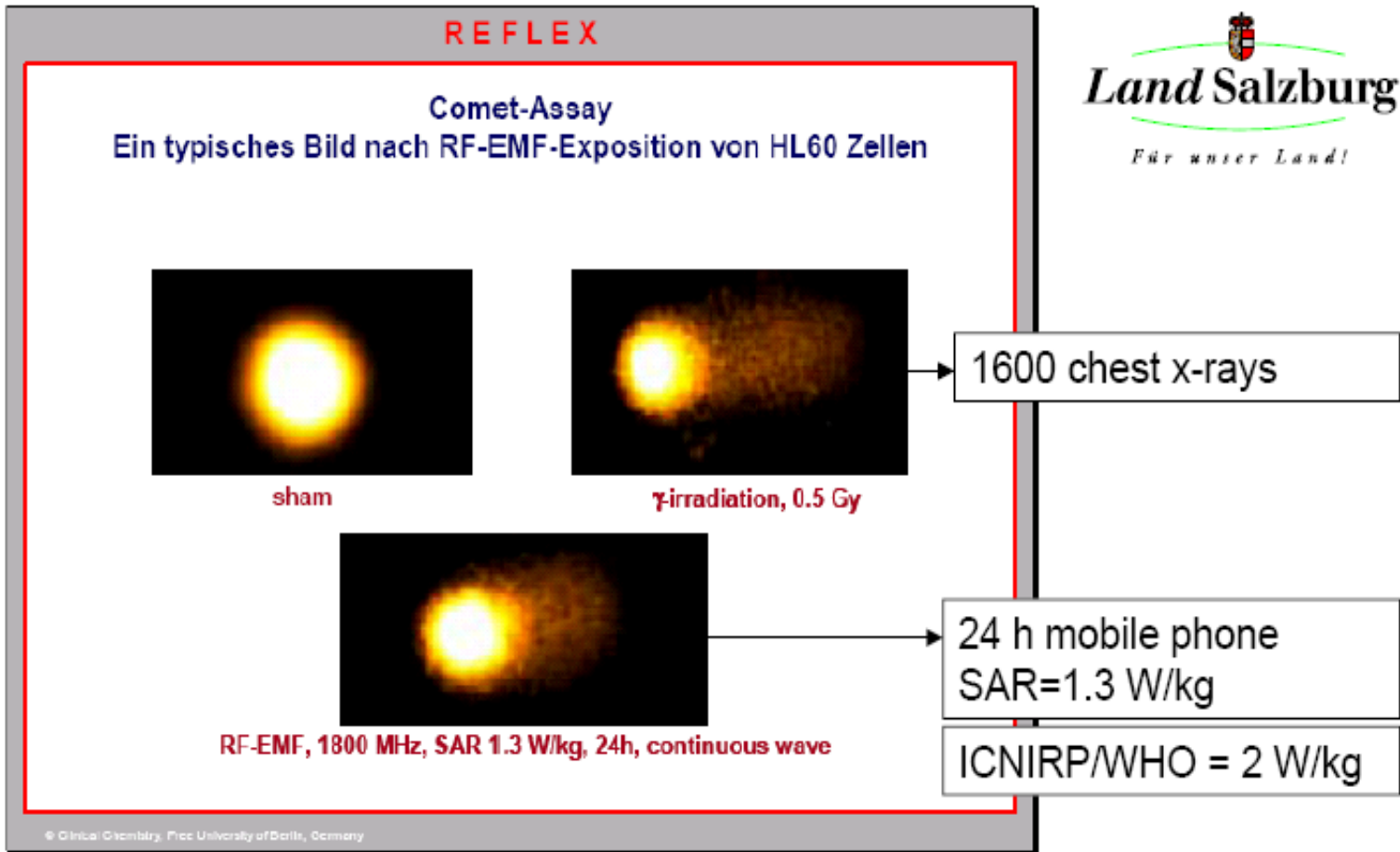


Urban Legend 1: Non-ionising radiation has too little energy to damage DNA

Approximately 25% of DNA breaks and cellular damage from ionising radiation are caused by high energy direct damage. The other 75% is caused by ionising radiation's well known ability to form free radicals in living tissue.

Data from the last decade suggest that non-ionising radiation is capable of producing free radicals which have resulted in DNA damage (Nikolova 2005, Friedman 2007, Yao 2008). So while it is true that non-ionising radiation does not have sufficient energy to break bonds and cause cellular damage directly, there are other accepted scientific pathways by which it may be able to damage DNA.

Published example of DNA damage



Urban Legend 2: “If it doesn’t heat you, it doesn’t hurt you”

The ICNIRP (+UK HPA / WHO / SCENIHR) model

Based on the amount of absorbed power, averaged over 6 minutes, required to heat body tissue by 1 degree – action level is set at ~61 Volts per metre at WiFi frequencies

- Varying levels of evidence for varying circumstances:
 - **Conclusive evidence / Beyond reasonable doubt (~95% and upwards)** – scientific proof
 - Preponderance / Balance of evidence (51% certainty) – legal standard used in civil actions
 - Potential for significant impact (~30% and upwards) – often used for environmental exposures
- The key problem from ICNIRP’s perspective is there is no understood mechanism
- Without the mechanism, they treat all epidemiological evidence with a pinch of salt

Urban Legend 2: “If it doesn’t heat you, it doesn’t hurt you”

Problems with the ICNIRP model

Significant biological effects have been found at levels as low as 0.6 Volts per metre.

While searching for a mechanism is an important part of understanding the underlying science, it is unreasonable to assume that the association cannot be causal until one is found. There is *still* no understood mechanism of lung cancer from smoking – the association was accepted on epidemiology alone.

“...The absence of certainty is not an excuse to do nothing...”

Christine Todd Whitman, US Environmental Protection Agency

Other internationally implemented standards (such as Belgium, Liechtenstein, Italy and a number of federal states in Austria) are considerably lower than ICNIRP – in some cases, lower than would be typically found in a wirelessly enabled classroom.

The BioInitiative Report

In 2007, a number of the world leading researchers jointly authored the 615 page BioInitiative report

- The scientists came from fields encompassing all 3 sciences
- Including 3 past presidents of the renowned Bioelectromagnetics Society (BEMS)
- Using a “weight-of-evidence” approach, they assessed in total over 2000 papers of relevant material
- They covered a wide range of health points and their association with RF exposure

Their findings were as follows:

“Given the scientific evidence at hand, the rapid deployment of new wireless technologies that chronically expose people to pulsed RF at levels reported to cause bioeffects ... including DNA breaks, increased free radical production, and changes in brain function including memory loss, retarded learning, performance impairment in children ... The recommended cautionary target level [for WiFi and other similar sources] is 0.1 microwatts per centimeter squared (or 0.614 Volts per meter) for pulsed RF where these exposures affect the general public; this advisory is proportionate to the evidence and in accord with prudent public health policy.”

BioInitiative Report, 2007

Urban Legend 3: EMFs have been all around us for centuries with no problems

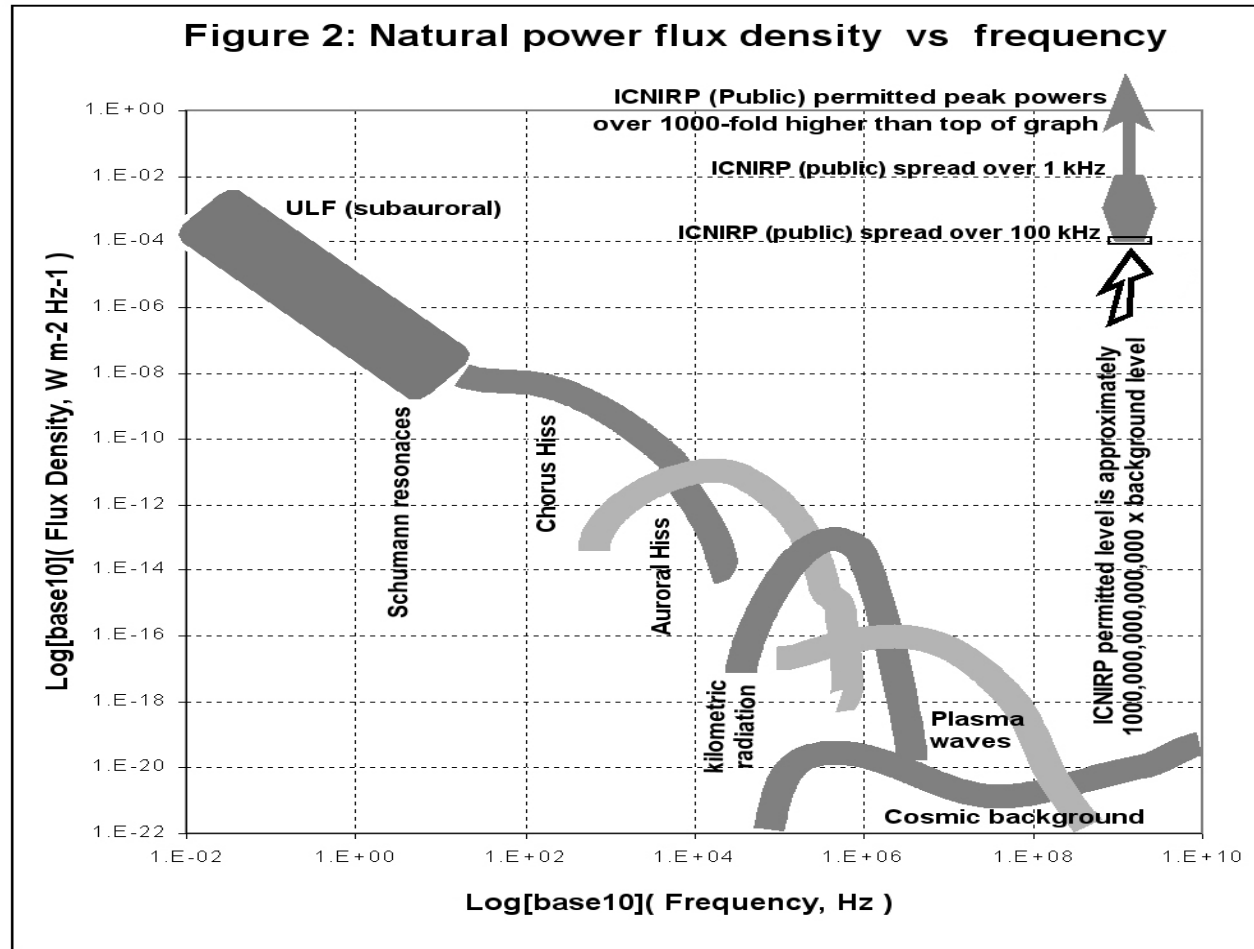
Urban Legend Tenets

- Exposure to electromagnetic fields is not new
- Visible light is a form of EMFs, and has been around for as long as life on the planet

However...

- The assumption that RF must be less harmful than light is due to absorbed energy – this belongs to ICNIRP's heating paradigm – absorbed energy is not the source of concern
- The concern over RF is due to published observational data showing biological effects
- Background exposure to RF EMFs is almost completely novel this century
- Background exposure to pulsed digital systems is novel in the last 2 decades

Ambient background EMFs



The research into WiFi

No studies in the peer-reviewed literature looking at health effects from exposure to WiFi.

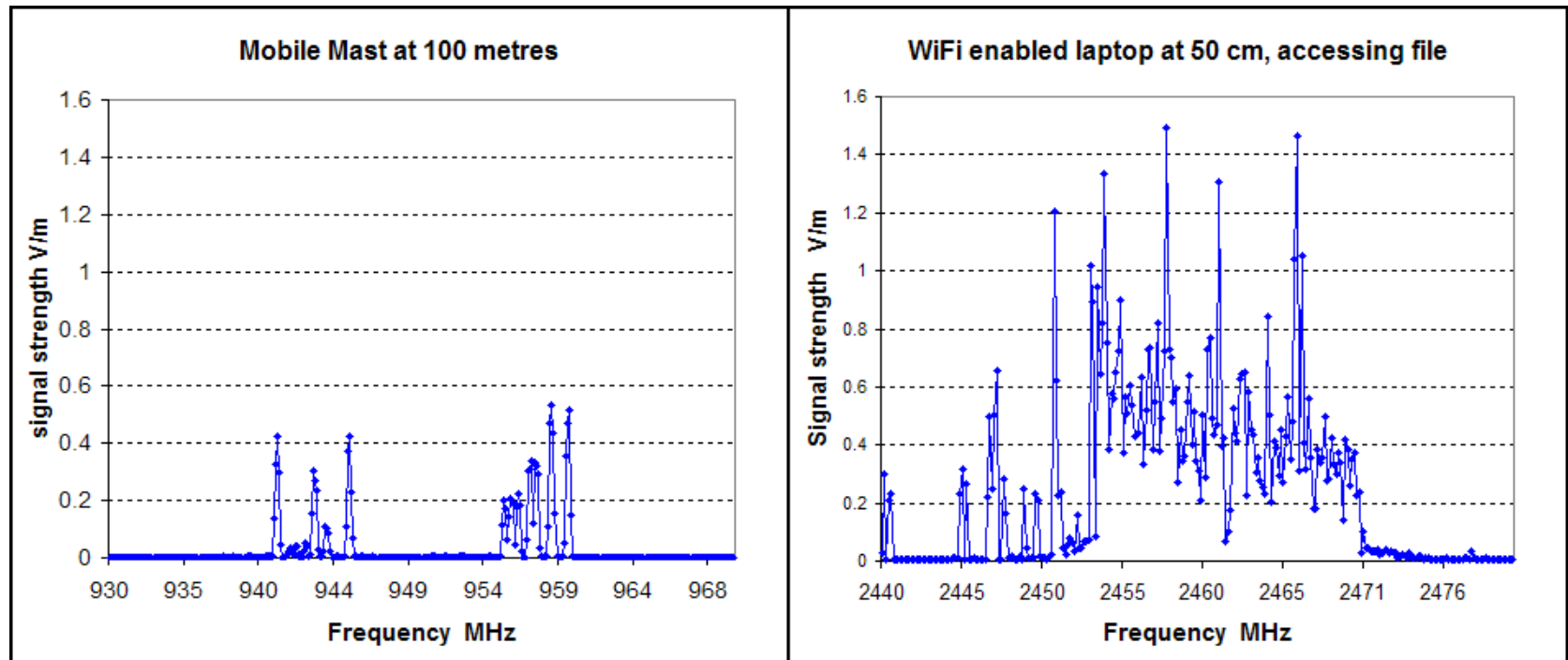
Two thorough investigations into exposure levels:

1. The first of which, back in 2006, was by the IT'IS laboratory in Switzerland
2. The second of which was an HPA study in 2009 into WiFi exposures in classrooms

Both found exposures far below ICNIRP guidance levels, giving rise to the HPA to conclude that “the results were reassuring”. However, there is good reason to believe that this is a reassurance that goes against the published literature to date.

While there is no research directly into WiFi and health, the typical exposure in a wirelessly enabled classroom is very similar to that of living within 50 to 100 metres away from mobile phone base stations, for which there is peer reviewed research.

Panorama – “WiFi – A warning signal”



Mobile phone base station evidence

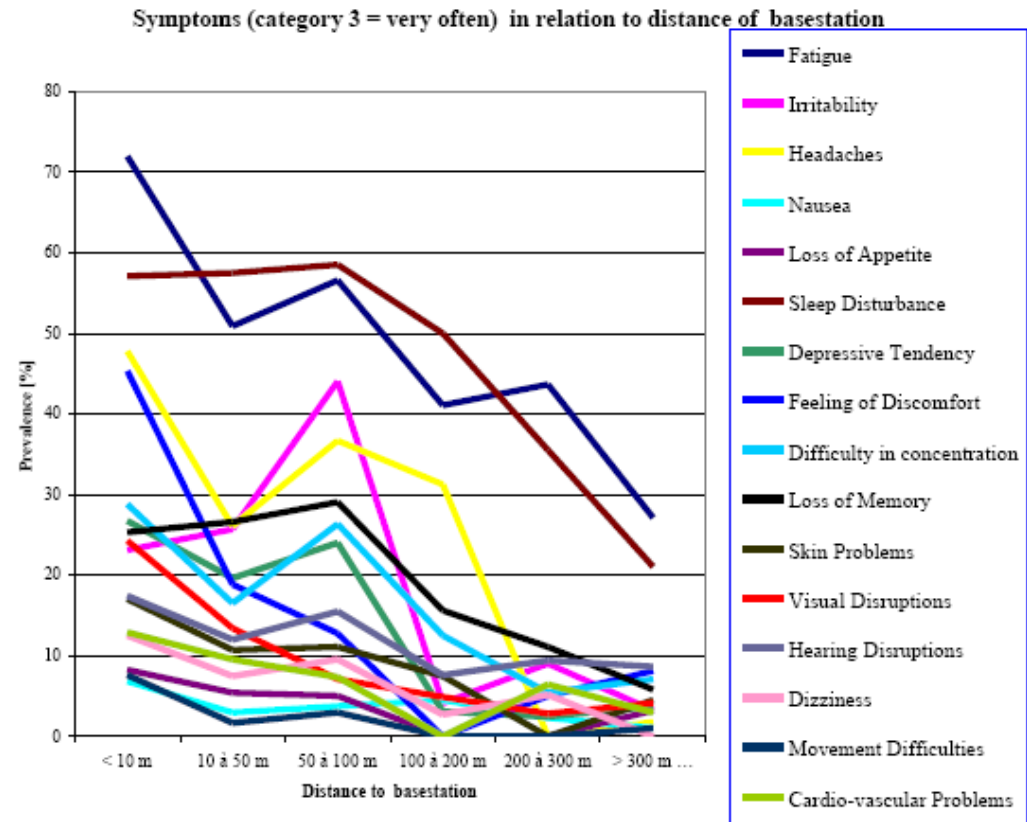
As of the end of last year, we are aware of only 14 published research papers in peer-reviewed journals into the health effects from proximity to mobile phone base stations on humans.

The findings so far are very concerning. Of the 14, only 2 assessed cancer, both of which finding a statistically significant increase from exposure (Wolfe 2004, Eger 2004). Of the other 12 looking at somatic symptoms, 3 failed to find an association (Heinrich 2007, Thomas 2008, Blettner 2008) compared to 9 finding an association (Santini 2002, 2003, Navarro 2003, Bortkiewicz 2004, Nikolova 2005, Hutter 2006, Yurekli 2006, Abdel-Rassoul 2006, Augner 2008).

Even more compelling is that the symptoms reported anecdotally from WiFi are exactly the same as those found most in the mobile phone base station research: headaches, fatigue, dizziness, concentration problems, poor memory retention, nausea, depression, behavioural issues and sleep disturbance.

Santini et al. 2002, 2003

- France
- 530 persons
- Selection by media announcement
- Exposure: participants' estimate of distance
- Outcome: list of 18 symptoms



Navarro et al. 2003

- Spain (La Nora, Murcia)
- 101 persons included
- Selection of 5% of population (70% response rate)
- Exposure: participants' estimate of distance and bedroom measurements
- Outcome: list of 18 symptoms

Symptom	<150 m (~1.1 mW/m ²)	>250 m (~0.1 mW/m ²)
Headache	2.17 ± 0.86 **	1.53 ± 1.00
Sleep disturbance	1.94 ± 0.92 **	1.28 ± 1.10
Concentration difficulties	1.56 ± 1.14 *	1.00 ± 1.06
Depression	1.30 ± 1.19 *	0.74 ± 1.01
Dizziness	1.26 ± 1.14 *	0.74 ± 1.05
Nausea	0.93 ± 0.99 *	0.53 ± 0.88

Abdel-Rassoul et al. 2006

Symptom	Exposed	Controls	Odds Ratio
Memory changes	28%	5%	7.5 [2.3 – 27.0]
Dizziness	19%	5%	4.4 [1.3 – 16.5]
Headache	24%	11%	2.8 [1.1 – 7.4]
Sleep disturbance	24%	10%	2.8 [1.1 – 7.4]
Tremors	9%	0%	p<0.01
Depressive symptoms	22%	9%	2.8 [1.0 – 7.9]
Concentration problems	17%	10%	1.8 [0.7 – 5.0]
Blurred vision	22%	15%	1.6 [0.7 – 3.9]
Irritability	27%	20%	1.5 [0.7 – 3.3]

Laboratory research into RF EMFs

There are now over 500 peer-reviewed laboratory studies in the literature covering various biological and health end points from radiofrequency electromagnetic field exposure.

The ratio of papers that have found a statistically significant outcome to those that have not is approximately 1 to 1. This ratio is considerably higher if the papers looking into a novel association that simply have returned a null result are removed – i.e. the selection focuses on the areas of literature where effects have been found and replications have been attempted.

State of the science in summary

No known mechanism

No health research into exposures from WiFi exists

However ...

Anecdotal evidence highlights specific symptoms of concern

Strong support from peer reviewed base station research

Strong support from dosimetry research that exposure is comparable

The symptoms associated are exactly what we want to avoid in a school environment

Therefore ...

Health research into WiFi should be an urgent priority

Until this research is carried out and published, precautionary action seems prudent

The 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

- Anecdotal reports are mounting that suggest increasing amounts of neurological complaints – symptoms that are particularly unwanted in schools and educational settings
- The small (but steadily increasing) scientific literature on similar technologies offers compelling evidence that for certain proportion of individuals, this effect is real
- In the absence of further data to confirm or deny the association, there are a number of practical and viable mitigation options available to minimise exposure to staff and children

“A precautionary approach is appropriate, and proportional, when the cost of inaction (if the risk is found to be true) is deemed to be higher than the cost of action (if the risk is found to be false)”

David Gee, European Environment Agency

Practical restrictions and limitations

- Turn off wireless access points when not in active use.
- Situate them as far away from child seating areas as possible.
- Avoid using WiFi if it isn't necessary for connectivity. Where classrooms already have wired network access, use this instead.
- Where classrooms have power but no wired network access, it may be just as cheap to use dLAN units and a switch to provide higher speed and reliability connections without any ambient EMF exposure.
- If any work is to be carried out either building a new classroom or providing it with new wiring, ethernet cables can be provided at the same time to minimise any labour costs.
- Turn off wireless capabilities of interactive white boards when not in active use.

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Many thanks for listening!