

Mobile Phones

The Mobile Phones set of articles is separated into 9 sections, each of which can be individually downloaded. It is a 'work in progress' incorporating new information whenever time permits.

Section 7 UK and international regulations and guidelines

1. Introduction; children and safety; mobile phone addiction; tracking and tapping phones; the impact of adverse weather patterns on phone calls; the environmental impact of the technology
2. Are mobile phones a health problem? Is the data trustworthy?
3. Brain tumours and other cancers; 13-nation Interphone study findings, and others; brain tumours; eye cancer; leukaemia; melanoma; personal experiences; pituitary; prostate; salivary gland tumours; skin tumours; stem cells; thyroid cancer; implications; Legal viewpoints
4. Dementia; reproductive effects; neurological effects; cognitive effects; brain activity, children
5. Biological control systems; heat shock protein; DNA; interaction with other environmental exposures and indirect affects; cellular mechanisms; blood changes; oxidative stress
6. Other health effects; general; allergies; babies; bacteria; balance and mobility; bladder; bone growth; bone healing; brain changes; cardiovascular changes; chronic fatigue syndrome (CFS); CNS effects; depression; diabetes; ear effects and hearing; emotionality; epilepsy and seizures; eye effects; gastric effects; growth; hand and arm effects; headaches; heart; hormone effects; immune system; kidney damage; life span; liver; migraines; mouth; multiple sclerosis; neuropathic pain; nose; pain perception; personality changes; physical activity; salivary gland effects; skin; sleep; stress; tendonitis; tinnitus; other effects; drug and other interactions; complexities of study design that may result in finding 'no effects'; animal, insect and plant experiments and effects; indirect effects; protective effects
7. UK and international regulations and guidelines; exposure places and bans, hospitals, physical therapies, prisons, railways, rural areas; Austria; Belgium; EU; France; Germany; India; Israel; Italy; Japan; Poland; Russia; Taiwan; USA
8. Things you can do to reduce your RF exposure. Phone, time, signal strength, switching off Blackberrys; vulnerable areas; texting; standby; other people; when travelling; headsets; SARs; antennas; electromagnetic noise; protective gizmos; jammers; supplements
9. References – 740 references

UK and international regulations and guidelines

The current ICNIRP Standard is based upon research examining the threshold for thermal (heat) damage to tissue (specifically, the amount of radiation that would cause cataract development). The power density necessary to produce cataracts is considered to be approximately 100 mW/cm² to which a safety factor of 10 has been applied. Thus, a maximum permissible level of 10 mW/cm² was established, a simplistic calculation, with no relevance for non-thermal effects.

Remember that you are unlikely to win compensation for ill-health damage caused by mobile phone use - the powerful vested interests have strongly fought every potential compensation claim to date. Sensible people should think hard and long before making or taking that mobile call.

Even the manufacturers of iPhones and BlackBerrys warn, in the guides that accompany them, that the phones should be kept 15mm and 25mm (respectively) away from their body.

Buckus (2014) reported that electromagnetic field radiation depends on mobile phone power class and factors, like urban or rural area, outdoor or indoor, moving or motionless position, and the distance of the mobile phone from the phone user. The highest electric field strength was recorded for calls made in rural area (indoors) while the lowest electric field strength was recorded for calls made in urban area (outdoors), though this did depend on the country where the measurements were made (Bhatt 2016). Calls made from a phone in a moving car gave a similar result like for indoor calls; however, calls made from a phone in a moving car exposed electric field strength two times more than that of calls in a standing (motionless) position. It is recommended to keep a mobile phone in the safe distance of 10, 20 or 30 cm from the body (especially head) during the calls.

Who decides on health risks?

One of the bodies determining health risks is the International Agency for Research on Cancer (IARC), a semi-autonomous part of the World Health Organisation (WHO). Many of its rulings have been controversial and have been disputed, including by industry, and includes the ruling that RF radiation causes cancer. IARC's resources are relatively modest, national Institutes of Health (NIH) grants having totalled some \$40 million between 1992 and 2014 (Reuters October 2016).

According to Adibzadeh (2015), the variation in the averaged SAR among heads can reach up to 16.4 dB at a 1 cm³ cube inside the brain (field-sensor method) and alternatively up to 15.8 dB in the medulla region (Talairach method). The authors show head morphology as an important uncertainty source for dosimetric studies of mobile phones. Therefore, any dosimetric analysis dealing with RF dose at a specific region in the brain (e.g., tumour risk analysis) should be based upon real morphology.

Exposure places and bans

Hospitals

Hospitals generally require mobile phones to be switched off in order not to affect the operation of some of the highly sensitive life support and other machines used in medical treatment and experimentation (Hietanen 2007, Hans 2008, Shahbazi-Gahrouei 2012) including ECG machines (Baranchuk 2009). The usage of mobile phones in Intensive Care Units carries with it a high incidence of interference with a number of medical devices like implantable defibrillators,

cardioverters, pacemakers, monitors and other important devices like ventilators (Yeolekar & Sharma [2004](#)).

Physical Therapies

Changes of ATPase activity and voltage dependent ion channel of hippocampus cell membrane were observed in mice exposed to 2.45 MHz microwave irradiation of 10 mW/cm² from a physical therapy machine. The authors of the study (Zhao [2003](#)) believed the changes could affect study and memory.

Prisons

In prisons phones were costing about £400 each in 2008, trade resulting in £9m, when 7,000 phones were seized. It is believed that three times as many handsets were in circulation as had been seized (BBC November 2009). The authorities are looking for technology to jam mobile phone signals in prisons.

Railways

The rail company, Trenitalia, has just created “relax” cars where silence is the norm, an arrangement which the Swiss Railway (CFF) has renounced for second class.

Rural areas

A study (Hillert [2006](#)) looking at the different factors that need to be considered when designing research into mobile phone usage, suggested that one of the important factors is that high mobile phone output power is more frequent in rural areas, see Hallberg's research ([2007](#)).

Austria

In Graz, Austria, mobile phones are supposed to be switched into ‘silent’ mode in public transport. Although not illegal to use a phone, the drivers of the bus can ask you to leave the vehicle if you do so (news report June 2008).

Belgium

In a press release dated 14.03.2013, the Belgian minister for Social Affairs and Health, Laurette Onkelinx and the Minister for Economy and Consumer Protection, Johan Vande Lanotte announced the submission to the Council of ministers of a draft for a Royal Decree for stricter regulations concerning electromagnetic radiation from mobile phones. Mobile phone suppliers may not offer and mobile phones specifically to those aged under 7; sellers must provide information on the Specific Absorption Rate (SAR) of individual mobile phone models. As part of a next step, Johan Vande Lanotte and Laurette Onkelinx intend to make it obligatory that headphones be included with every mobile phone.

In November 2008, Paul Magnette, the Belgian minister responsible for consumer protection, refused to authorise the marketing of mobile phones intended for children. *“With this type of phone children can actually be exposed to mechanical dangers or the risks of radiation. In fact scientists all recognise that it is necessary to limit children’s exposure to cumulative amounts of radiation, even if not much is yet known about how sensitive they are to radio waves.”*

The Belgian Foundation Against Cancer warns that intensive use of a mobile phone can increase the risk of contracting cancer. They suggest that children younger than 12 should not use a mobile phone, and that using a mobile phone as an alarm clock is not desirable because the phone is in close proximity to the head the entire night. The Cancer Foundation also strongly advises people not to use a mobile phone in the car or a train.

EU

In 2009, Next-up reported that the SAR of some phones did not keep below the EU limits, and exceeded the manufacturers' specifications.

The European Parliament Commission on the Environment, Public Health and Food Safety published, in February 2009, a report concerning the effects on human health of EMFs. It explained the reasons for its resolutions that the human body has a natural capacity to emit electrical fields. The electrical activity of the heart as well as that of the brain can be recorded by an electrocardiogram and an electroencephalogram. They questioned whether this natural electrical activity could interact with the EMFs generated by human activity. The resolutions included:- to lower 1999 exposure guidelines; to set up a dialogue between industry and groups to keep children and the sick away from phone masts; to investigate the biocompatibility between the radiation and human natural fields; to condemn marketing mobile phones to children; to look at WiFi and cordless phones in the home as they expose people to emissions.

The European Parliament resolution of April 2009 suggested that Community funding earmarked for studies on EMFs be partly switched to finance a wide-ranging awareness campaign to familiarise young Europeans with good mobile phone techniques, such as the use of hands-free kits.

In September 2009, The European Environment Agency felt that the evidence for harm is strong enough, using the precautionary principle, to justify the following:

- Governments, the mobile phone industry, and the public should take all reasonable measures to reduce exposures to EMF, especially to radio frequencies from mobile phones, and particularly the exposures to children and young adults who seem to be most at risk from head tumours.
- Reconsider the scientific basis for the present EMF exposure standards which have serious limitations such as reliance on the contested thermal effects paradigm; and simplistic assumptions about the complexities of radio frequency exposures.
- To provide effective labelling and warnings about potential risks for users of mobile phones
- To generate the funds needed to finance and organise the urgently needed research into the health effects of phones and associated masts. Such funds could include grants from industry and possibly a small levy on the purchase and/or use of mobile phones. The research funds would be used by independent bodies.

In 2011, MEPs recommended that, based on the precautionary principle, *“the commission should immediately inform the public on ways to reduce exposure to mobile phone radiation, reduce the radiation exposure limits and encourage independent scientific studies to further examine these first warnings.”* They added *“Although our understanding is incomplete, this should not prevent policymakers from taking preventative action.”*

France

France's health ministry warned parents to prevent children using mobile phones when reception is poor or during high-speed travel. They advise limiting the use of mobiles overall, and

recommend that children and pregnant women limit their mobile phone use and use land lines wherever possible. France is introducing legislation to ban advertising of mobile phones to under-14s and their use in nurseries and primary schools.

It is obligatory for the phones' SAR to be displayed in point of sales advertising and other publicity, and on any packaging provided (Decree n° 2010-1207).

Germany

The new government of Baden-Württemberg is concerned about insufficient research into the potential health effects of RF. In April 2011, they adopted (amongst others) the following principles

- Wired alternatives will be implemented and promoted by the state government wherever possible. For example, WiFi networks at public institutions and wireless Internet access in cities and rural areas shall be avoided. The state government calls on all municipalities to deploy sustainable fibre-optic technology instead of LTE (4G).
- A moratorium is placed on the implementation of LTE because this new technology will contribute to a massive increase in radiation exposure and the health impact is not yet clear.

India

In September 2007, the Karnataka government in India banned the sale of mobile phones to children under 16, and the use of the phones in schools and colleges. The Health Minister said parents should discourage the use of mobile phones by under-age children at home also, because of health effects, including brain cancer. Professor Girish Kumar of IIT-Bombay's department of electrical engineering warns against excessive use of cell phones, especially by children, due to increased risk of cancer, brain tumours and other health hazards.

Israel

In February 2011, the Israeli Ministry of Health and Environment put a halt on the deployment of LTE for now due to the lack of research (Jerusalem Post 28/02/2011). *"Radiation effect must be checked before 4G system is okayed."*

Italy

The mayor of Udine, Italy, launched a campaign inviting tradespeople to ban the use of mobiles in their establishment. 16 bars, restaurants and hotels have already subscribed to "cell phone-free, talking-free." (Corriere della Sera). Another mayor, Furio Honsell, makes his Municipal Council switch their phones off, to avoid disturbing meetings.

In 2009, a Labour Tribunal recognised the occupational origin of the illness of a man who was a company executive in Brescia. The judge accepted the causal link between his phone use and his brain tumour and his subsequent declaration of disability.

Japan

Japanese research by Dr Hondou, reported in New Scientist in May 2002, claimed that exposure to RF radiation in trains could theoretically exceed ICNIRP levels (over 40 V/m) due to metal train bodies making "hot spots" if many people were using their phones, when the train is not

very full. The level can exceed 6 V/m in the heads of passengers who are sitting next to, or behind, a phone user (Hondou, 2002).

Now WiFi is also available for laptop computer use in trains, general exposure is increasing. We believe it is a very antisocial practice to radiate non-users anyway, and phones (or internet connected laptops) should not be used in trains, except in an emergency.

Poland

The electric field strength corresponding to the occupational exposure level was measured at a distance of 45-65 cm from the portable radiophones using the conventional system and 75-95 cm from antennas of trunked system radiophones used by rescue and uniformed services. The electric field strength exceeding action levels were found within 10-15 cm from radiophone antennas (Gryz [2013](#)).

Russia

Russia, a country that has put in a lot of time and effort into researching the possible health effects, has far more precautionary guidelines on the subject than we have in the UK. The RNCNIRP (Russian National Committee on Non-Ionizing Radiation Protection) gives the following advice (2002):

1. Children under the age of 18; pregnant women; people with pacemakers should not use mobile phones.
2. Those people suffering from neurasthenia, psychopathy, sleep disorders, memory loss, epilepsy, etc should not use mobile phones.
3. Calls should be limited to 3 minutes, and 15 minutes should be allowed to elapse before a further call is made. Headsets and hands-free systems are encouraged. They say that retailers should include the following information at the point of sale a) all of the above recommendations with regard to restrictions on use b) all relevant health and epidemiological data on mobile phones, together with the radiation exposure levels associated with the phone and the name of the measurement lab.

Taiwan

Taiwan has banned parents from letting children under 2 use radiation devices.

USA

In the USA, various places and organisations have made suggestions as to mobile phone use. State Representative for Maine, Andrea Boland, said she is convinced from what she has read that the radiation from cellphones increases the risk of brain cancer when held at the ear, especially in children under 18. She is pushing for Maine to be one of the first US States to make mobile phones display health warnings about brain cancer, in a similar way to the warnings on packets of cigarettes.

The US President's cancer panel reported, in May 2010, *"Scientists are divided on whether there is a link [between brain cancer and cell phones]. Until more research is conducted, the panel recommended that people reduce their usage by making fewer and shorter calls, using hands-free devices so that the phone is not against their head and refraining from keeping a phone on a belt or in a pocket."*

In **San Francisco**, Mayor Gavin Newsom introduced in 2010 a measure to make mobile phone packages display the amount of radiation a phone emits. The wireless industry trade group

(CTIA) sued the city insisting that the city is usurping the authority of the Federal Communications Commission, which sets limits for phone radiation. The lawsuit is not the first response from CTIA. The association, which represents all major wireless carriers, usually holds a trade show in San Francisco. After the law was passed, CTIA announced that it would hold the show that had already been planned in autumn 2010 as planned, then look for another host city.

In Oregon 2011, a bill was passed requiring retailers to put warning labels on mobile phones and packaging of wireless devices, advising consumers of possible risks associated with RF exposure. Chip Shields, a Democrat with 5 other Democratic and Republican state lawmakers, introduced the legislation amid growing concern that long-term exposure to mobile phones could lead to health problems.

The wireless trade group (CTIA) has successfully fought legislation in California and Maine, sending lobbyists to speak at public forums against warning labels. John Walls, CTIA's vice president of communications says *"Warning labels would mislead consumers suggesting that wireless devices are not safe."*

A memo sent by Dr Ronald Herberman, director of the University of Pittsburgh Cancer Institute, supported by Devra Lee Davis, the director of the University's centre for environmental oncology, said children should use mobile phones only for emergencies because their brains are still developing. Herberman also sent a memo to staff members warning them to limit their phone use and to use hands-free sets in light of *"a growing body of literature linking long-term cellphone use to possible adverse health effects including cancer."*