

## Introduction

Mobile phones have been steadily increasing in popularity and use since their first introduction in the 1980s. We present a few statistics about usage both in the UK and across the world.

- There are more mobile phones than people in the UK - over 77 million, more than the number of UK inhabitants. As of June 2009, there were an estimated 4.3 billion mobile phone users worldwide. The tax revenue is about £20 billion. The UK telecommunications turnover in 2008 was £62.2 billion.
- According to the Daily Mail in 2011, 15% of UK households have only mobile phones; this increases to 26% for households of 15-24 year olds. In June 2010, 25% of US households had no landline phone. The Czech republic have 63% of households and Finland 61% without landline phones. In South Africa mobile phones outnumber fixed lines by eight-to-one, largely due to the lack of an extensive landline network.
- In 2008, 44.5% of all call minutes originated on mobile phones, and cost the average household £32 per month.
- 8 million people, 16% of the adult population, use the internet on their mobile phone. In 2010, 38% of US adults access the Internet with it, 9% have made a purchase with their phones (20% of those aged 18 to 29) and 20% have viewed a video.
- The 737 minutes per month that US mobile phone users talk on their phones, on average, make current users indistinguishable from the heavy user of 10 years ago. This certainly has implications for the conclusions of many of the research studies showing health effects, including cancer, for heavy users of mobile phones. The average USA mobile phone user between April 2009 and March 2010 spent 25 minutes per day on voice calls. This information has been extracted from their bills which is probably more accurate than recall. Many claim to use their phone much more extensively than this.
- 300 million fewer women than men in developing countries own a mobile. An initiative, championed by Cherie Blair, called mWomen proposes to halve this 'gender gap' within 3 years, with special female-specific handsets and tariffs.
- 15% of Americans have interrupted sex to answer a mobile phone call; 32% of men and 23% of women say they can't live without their mobile; 28% of teenagers admit to texting whilst driving which makes them 23 times more prone to accidents; 30% of teenagers have received pornographic texts or videos of one of their friends; one phone available in China has a stun gun attachment that packs a 800,000 volt punch;
- Mobile phone theft accounts for 33% of UK street crime.

There has been a downward trend in the proportion of pre-pay subscriptions, as operators have attempted to lure pre-pay customers onto monthly contracts against a background of slowing overall subscriber growth. On average, contract subscribers spend around four times more per month on mobile services than pre-pay customers. A lot of the "pay as you go" phones are left unused when their owners get a new phone on a monthly contract.

The average age at which a child gets their first mobile phone is 8 (Daily Telegraph February 2009), and more than 35% own a phone by this age. According to Populus, which did a survey

reported in the Daily Telegraph in February 2009, 75% of children aged between 7 and 15 own 'at least' one mobile phone.

Apparently, 26% of UK mobile phone users would give a child a mobile phone for safety reasons. It is unclear why this should be, as some of the children we hear about who have been kidnapped, then murdered, have had a mobile phone. It is the first item an abductor would dispose of. According to the police there is a dramatic increase in mobile phone theft on the street, in violent incidents when the phone is the only thing taken. Through their mobiles children can, for instance, be exposed to bullying, disturbing and explicit images, gambling, predators and rip-off schemes. In a survey reported in the Daily Express only 36% of parents stopped their children from accessing the internet on their mobile phone. Rod Barnes, head of mobile phones at moneysupermarket.com said *"Take heed of warnings regarding internet access and look into whether filters can be placed on your child's mobile to bar access to specific sites."* Far from a mobile offering you peace of mind about your child's safety, it may be exposing them to pornographic sites and paedophiles 'grooming' them for dubious contacts.

BT reported in July 2008 that almost 60% of their payphones were unprofitable, with almost 6,000 phones making less than one call a month, and more than 50% making less than one call a week. Payphone usage had halved in the last 2 years and calls were still declining at 20% year on year. This system now seems to be completely non-viable. It is difficult to see how anybody in the future, including young people, are going to be able to make phone calls from a public box in an emergency.

## Mobile phone addiction

There have been suggestions that mobile phone use is addictive. Professor Lai and his team at the University of Washington have found that radio frequency radiation activated endogenous opioids, compounds generated by the brain which behave like morphine. An increase in endogenous opioid activity in the brain caused by microwave radiation is known to increase alcohol-drinking behaviour. In [2000](#), Charlton & Bates suggested that addiction to mobile phone use has been replacing cigarette smoking in young people. 75% of British teenagers say they literally could not bear to be without their phone.

The following quotations show what effect this addiction can have on families -

*'We give our daughter a reasonable amount of pocket money with extra for her school dinners. We learnt that all this money is being spent on texting her friends. She hasn't had a meal in school for the past 2 months and worst of all considers no other activity or hobby worthy of her pocket money.'*

*'My daughter no longer communicates with the family, her phone has to be beside her day and night, we often hear her texting or talking in the early hours of the morning, her homework is suffering, her hobbies no longer take priority ....she is not the daughter we once had'*

*'I discovered our daughter had been using my credit card without my permission to buy more call minutes for her phone.'*

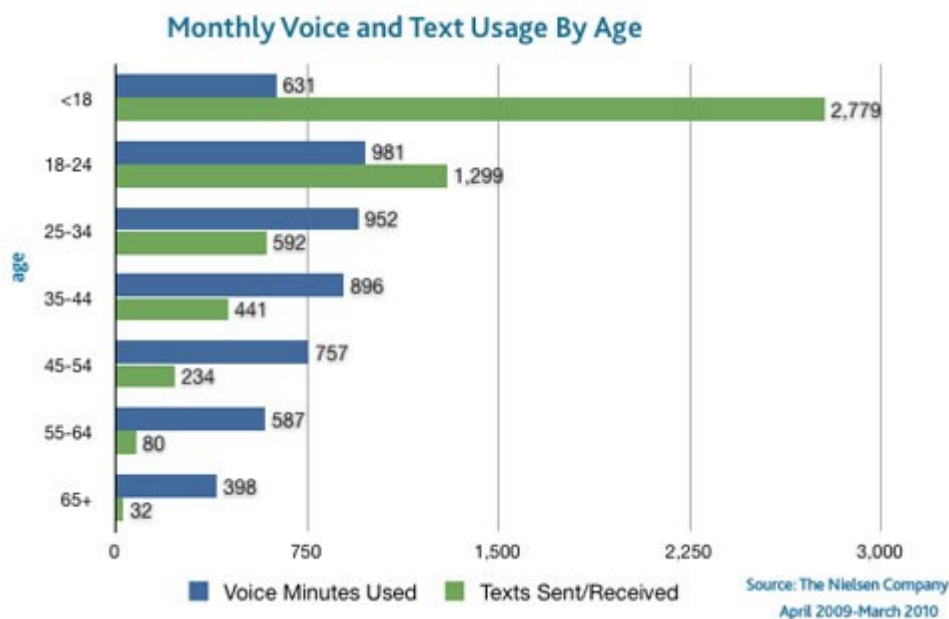
Others have stolen money from the parental purse to obtain money to 'feed' their habit. The children, especially girls it seems, are as much prey to danger (of many sorts) by having a mobile phone, as the ones their caring parents were trying to save them from.

Many young people watch TV on their phone. In Norway, adverts from 20 different companies are targeted to viewers, depending on the information given to broadcaster NRK when they signed up for the two month trial of the system. According to Gunnar Garfors of NRK, *"We know lots about the viewers; we have their phone numbers, their name, sex and where they live. We can also*

*determine their presumed interests when we see what they watch or listen to and what times they do it. And we know where they are geographically because of positioning technology.”*

Many mobile population subsets, such as students, do not have ready access to wired phones, and can be heavy users of mobiles. A study of medical students in Yazd, Iran, showed that students spent an average of 40 minutes talking and 65 minutes listening to music per day. They also received or sent about 28 text messages per day. They reported using their phones in the following places – 87% at home, 80% in the street, 37% in the classroom, 19% when driving and 18% in the library.

A report in the US in 2010 showed the following information about the number of voice calls and text communications by month and by age.



## Tracking and tapping phones

It is relatively simple to follow a person via their mobile phone. Plenty of companies offer the technology to do so, legally and with the phone user's knowledge. The same process can be employed to locate the user without alerting them. Qualified services may achieve a precision of down to 50 meters in urban areas where mobile traffic and density of base stations is sufficiently high. Rural and desolate areas may see miles between base stations and therefore determine locations less precisely.

The SIM card has its unique International Mobile Subscriber Identity (IMSI) number. The second number is the International Mobile Equipment Identity (IMEI) and is specific to the handset and remains constant even if the SIM card is changed. Mobile phones transmit these numbers each time they make a call, or log on to the nearest base station when the phone is on standby. Once the tracker knows which mobile they are looking for, it is not hard to locate, if you have the right information.

Tapping a mobile phone uses a device called an IMSI-catcher. This pretends to be a legitimate base station of the mobile phone network and tricks the phone into routing its call via the IMSI-catcher where it can be passed on for decryption. Once received, the IMSI-catcher passes the call on to the network, so the suspect is none the wiser that he or she is being monitored.

Officially, authorities like the police can obtain permission to position phones in emergency cases where people (including criminals) are missing. In some instances law enforcement may even access a mobile phone's internal microphone to eavesdrop on local conversations while the phone is switched off ([CNET News 2006](#)). US District Judge Lewis Kaplan said that the eavesdropping technique "functioned whether the phone was powered on or off." Some handsets can't be fully powered down without removing the battery; for instance, some Nokia models will wake up when turned off if an alarm is set." Newsweek, in June 2009, reported that wiretapping programmes can easily be transferred to any mobile phone. The latest programmes can silently turn on handset microphones even when no call is being made, allowing the covert listener to hear voices in a room halfway around the world.

Private investigators and consultants in counter-wiretapping, computer-security software and telecommunications market research, claim that a surprising number of people carry a mobile that has been compromised, usually by a spouse, lover, parent or co-worker. Private investigation companies believe that up to 5% of mobiles are tapped. This figure does not include government wiretapping. Some "free" tracking services allow the mobile phone number being tracked to be added to telemarketers' lists.

A combination of tapping and tracking has been usefully used by the police to identify and catch terrorists (BBC news August 2005). However, tracking systems can work both ways. A mobile phone application worth less than two pounds precisely tracks aircraft in flight and it has caused concern that it could make them terror targets (Daily Mail October 2010). The Plane Finder AR application allows users to point their phone at the sky and detect the position, height and speed of nearby aircraft. It also shows the airline, flight number, departure point, destination and even the likely course. British and European air traffic control systems have not yet adopted the technology but it is being fitted in all new aircraft, which now constantly broadcast their positions.

Users are being urged to enter a number in their phone's memory under the heading ICE - In Case of Emergency. This is intended to facilitate identification of people who have been injured in such a way that they cannot communicate. It does have security implications, though, possibly making identity theft easier.

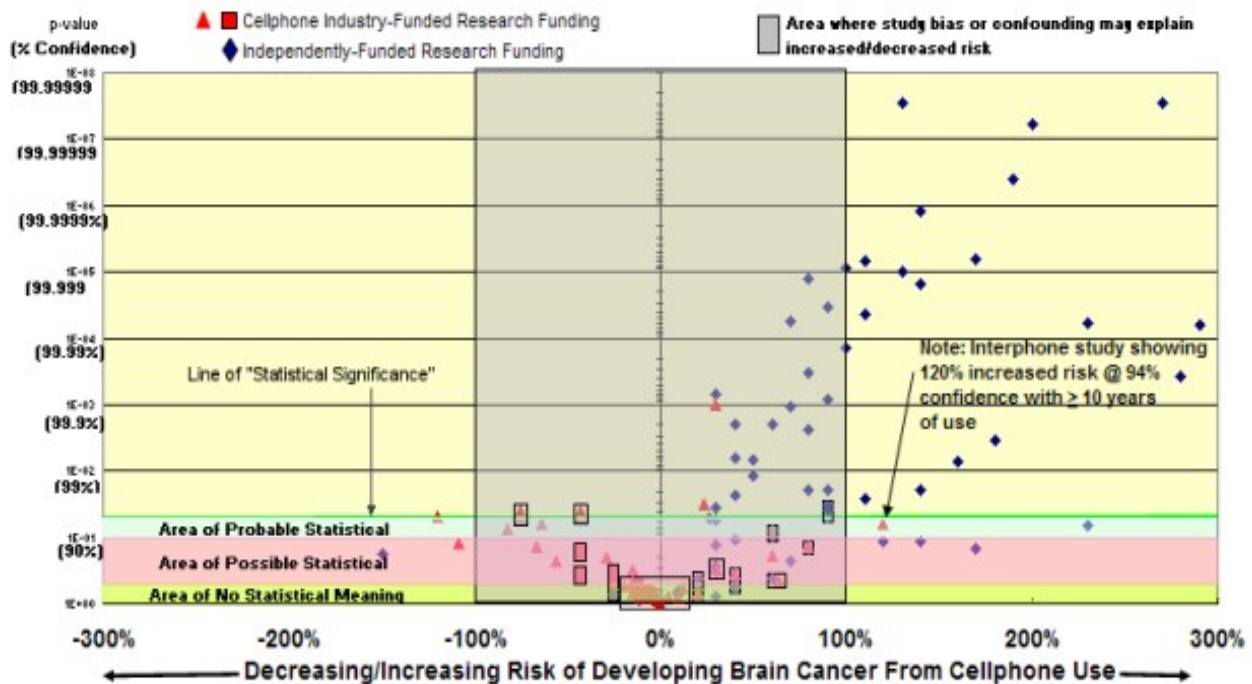
4G technology (LTE, Long-Term Evolution), which is about 100 times faster than 3G, including full-motion videos, home entertainment systems, advanced location systems, etc. is currently being rolled out. This will mean a new generation of phones (and their accompanying mast infrastructure).

## **Mobile Phones, a health problem?**

The evidence that there are possible or probable problems with mobile phone use is growing rapidly. Most of the research findings of cancer and other health effects arising from the use of mobile phones are detailed in sections 2 to 5.

## **Is the data trustworthy?**

Cynics may ask "Surely the fact that more than 15 billion pounds income goes to the UK government each year in taxes from the sale of phones and the calls made would not influence the funding or results of health research?" The results reported by Lloyd Morgan, Director of a USA Cancer Registry, are clearly not good news for the mobile telecommunications companies, and their concerns may have influenced the research, as shown in the graph below.



Two leading EMF and health experts, Professor Ross Adey and Dr Henry Lai, revealed in May 1999 that multi-national companies had tried to influence the results of their research. Professor Adey, a biologist, said he had had his funding withdrawn by Motorola before completing his research which showed that mobile phone emissions affected the number of brain tumours in animals. Professor Lai, who has been studying the biological effects of electromagnetic fields for over 20 years, was asked three times to change his findings on how such fields caused DNA strand breaks in rats. Dr Jerry Phillips' work, supporting Professor Lai's experiments, led to his contract with Motorola being terminated when he published his results. Dr George Carlo, who used to be a spokesman and researcher for the mobile phone industry, bitterly criticised the industry for failing to act on his findings and for not taking safety seriously. Lloyd Morgan's graph (above) seems to confirm this bias.

Telstra (an Australian telecommunications company) employed a medical officer, Dr Bruce Hocking, who referred four employees to a neurologist after they reported headaches and dizziness when using their mobile phones. The company lawyers decided to cancel the employees' appointments and Dr Hocking was made redundant. Professor Roger Santini in France reported on 530 people who were exposed to mobile phone mast antenna radiation and 18 of their symptoms, before he was told to 'shut up or leave' by his employer INSA, a state-funded research institution.

A [review](#), in 2006, funded by the Department of Social and Preventative Medicine at the University of Berne in Switzerland, by Huss found that studies exclusively funded by industry were least likely to report a statistically significant result, and concluded that *"The interpretation of results from studies of health effects of radiofrequency radiation should take sponsorship into account."*

Some studies which use questionnaire responses as the basis for their information, have been criticised as subject to recall bias and therefore are likely to be inaccurate. Often the criticisms suggested that the bias would result in risks being exaggerated. However, recent work by the Interphone group, an International research collaboration involving 13 countries (Vrijheid et al [2006](#)) and a study by Schüz & Johansen [2007](#), claim that heavy users tend to overestimate their total usage which, if correct, would mean that e.g. statistically significant increases found by the Hardell group in heavy mobile phone users may in fact be for less usage than actually reported. If

so, this consequently implies that the brain tumour risk from mobile phone usage may be greater than that suggested by Hardell, see Section 2 for details of Hardell's work. Lennart Hardell is an oncologist who has published many papers, we list some of them, ([2000](#), [2001](#), [2002](#), 2002, [2002](#), [2003](#), 2006, [2006](#), [2008](#), [2009](#), [2010](#)) showing strong links between mobile phone and cordless phone use and brain tumour risk. The use of cordless phones was not assessed in most Interphone studies, which would dilute the risk estimates. Cordless phones have a median power in the same magnitude as GSM phones, and are used for longer calls.

Because of increasing public concern, in 1999, the Government Health Minister instructed the UK National Radiological Protection Board, (which became the HPA -RPD), to set up a completely independent committee to examine the science of mobile phone safety. The committee was chaired by Sir William Stewart. The report was made public in May 2000, becoming known as the "Stewart Report".

Following the publication of this report, Sir William Stewart commented to the Trade & Industry Select Committee: *"It is simply not possible to say that there are no potential effects on the human population. It is difficult to talk about the population because populations vary. Antibiotics do a wonderful job for the general population, but there is a subgroup in the population that is allergic to antibiotics; they cannot take them. There is a sub-group in the general population who cannot eat nuts because they are allergic to them. That is why we refer to the general population. The other point is that we mentioned health effects and well-being effects. On the basis of discussions such as those we came to advise on the need for a precautionary approach."* [Trade & Industry 10<sup>th</sup> Report April 2001]

People are likely to respond in a variety of ways to the electromagnetic fields emitted by mobile phone technology. We believe that some people will suffer ill-health effects and some may possibly be able to use the technology in an almost unlimited way and not experience any related problems. Many of the symptoms reported by mobile phone users are also associated with other medical conditions and may not be recognised as reasonably common side effects of mobile phone use by either the patient or the GP.

We are unable to predict with any reliability the individuals who will develop idiopathic (allergic) responses to common substances. Mobile phones are thought to behave in a similar way to other allergens and trigger unusual adverse responses in a susceptible proportion of the population.

Although the subject is still being vigorously debated, most of the leading independent researchers, though not all, in this field are clear that there are biological effects (Lantow [2006](#), Valbonesi [2008](#)), though some suggest it is purely psychological (van Rongen [2009](#)). Changes in cell structure and communication, changes in reaction time ([Cao 2000](#), [Koivisto 2000](#)), concentration and memory problems ([Koivisto 2000](#)), summarised in a 19 study meta-analysis by Barth ([2008](#)), are being widely reported. What is as yet unclear is whether these changes are short-term, or whether there is a cumulative effect that may have quite serious health consequences in the medium to long term. It has been suggested that probably 5 -10% of the population suffers from short-term effects. This represents between 2½ - 5 million adults in the UK alone who may be vulnerable to adverse health effects due to microwave radiation and pulsed EMFs from the batteries in their phone. Phone radiation has also been associated with harmful interaction with medical implants and with drugs prescribed for various medical conditions.

In most experimental conditions looking at the effects of mobile phones on people, only RF radiation is taken into account. ELF from the phones' battery is discounted. In a study by de Tommaso ([2009](#)), it is clearly shown that ELF EMFs from the battery and internal circuits had as much of an effect as the RF. This finding is very important for researchers who devise 'sham' exposure to take into account, so that ELF exposures are also removed.

Dr Carl Blackman (2009) criticised the public exposure standards *“More recent studies of modulated RF signals report changes in human cognition, reaction time, brainwave activity, sleep disruption and immune function... Current standards have ignored modulation as a factor in human health impacts, and thus are inadequate in the protection of the public in terms of chronic exposure to some forms of ELF-modulated RF signals. The current IEEE and ICNIRP standards are not sufficiently protective of public health with respect to chronic exposure to modulated fields.”* He also says *“The collective papers on modulation appear to be omitted from consideration in the WHO and IEEE science reviews. This body of research has been ignored by current standard setting bodies that rely only on traditional energy-based (thermal) concepts.”* Robert Becker in his book *“The Body Electric”* adds *“experiments in which cells or organisms are exposed to a single unmodulated frequency, though sometimes useful, are irrelevant outside the laboratory.”*

When a mobile phone is used, the radiation comes from the whole phone not just the antenna, so the face, ear and back of the phone-side of the head are all exposed. Some of the radiation given off by the phone passes through the body, some bounces back from the surface of the body and typically, 60-80% of the phone's total radiation is absorbed by the user; the exact level depends critically on the make and model and how it is held. Also, because of the pulsing nature of the signals, real low-frequency (217 Hz) magnetic field pulses are generated in the handset that travel right through the user's brain at levels of several microtesla; note that the level of ELF fields associated with childhood leukaemia is only 0.4 microtesla. The smaller the user's head, the further into the brain the microwave radiation can penetrate. The fact that children's neurological systems are still developing underlies some of the concern about the use of mobile phones by young people. For further information, see our article *“Children and Mobile Phones”*. A study by Peyman on the conductive qualities of rat brain tissues exposed to RF found (2001) that they changed with the age of the rat. If we can map this onto human brain tissue, which we may not be able to, it may show that what happens at some ages may not always be the same at other ages.

Will the use of a bluetooth ear device help a user avoid the radiation from a phone? The answer is not straightforward, it will expose you to slightly less than the phone handset, but, being wireless, it is also transmitting itself, and therefore also exposing you. You would be better off buying a phone case such as the EMFields [BlocSock](#), or using an air-tube [handsfree](#) kit.

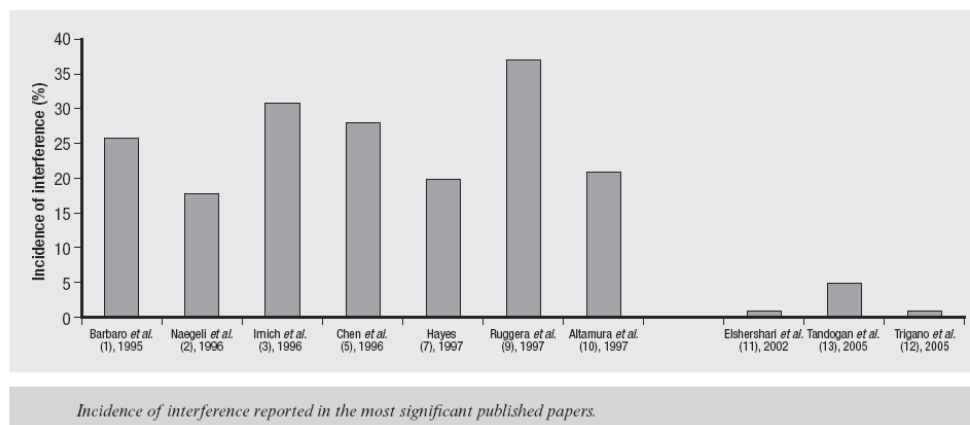
Cancer is a disease that very roughly doubles in frequency of occurrence every decade of our lives. The mechanism for suppressing potential cancers must allow exceptions for normal growth and proliferation. If this mechanism is interfered with by RF radiation, our children are likely to suffer from a much higher incidence of cancers than previous generations as they get older. In a study by Cleary (1996), RF radiation exposure changed cell proliferation rates but it did depend on exposure levels and cellular state at the time of irradiation. They found significant and quantitative differences. A review of new data between 2004-2007 by Habash (2009) stated that there are a number of potential issues from RF radiation, sufficient to promote caution and further research, especially use by children.

Dr Taal of the Tallinn Technical University in Estonia found some mobile phone handsets that emitted magnetic fields of several microtesla and electric fields of over 1,000 volts per metre (Taal 2001). These figures seem high, but certainly several hundreds of volts per metre have been measured by several researchers close to handset antennas. Pedersen and Andersen (1999) found that ELF magnetic fields can be up to about 3 microtesla in the centre of the user's head. We know that pineal melatonin synthesis (melatonin has a significant role in maintaining our immune system, repairing pre-cancerous damage among other things (Henshaw 2002)) can be reduced at 1.6 microtesla and so this could be one of the mechanisms by which mobile phone handset use could also increase the number of cases of clinical depression (depression being associated with low levels of melatonin)(Cao 2000). Burch (2002) found that prolonged use of cellular telephones

may lead to reduced melatonin production, especially when combined with power-frequency exposure.

The emergency services communications system, TETRA, caused concern about the possible increase in cancer of the spine, liver and kidneys that was believed to result from handsets being worn on the belt. Professor Colin Blakemore suggested that, if police officers (the first users of the system) were concerned, protective screening can be designed into the police uniform to protect against the emissions from a TETRA handset. The Medical Devices Agency (MDA) ([www.medical-devices.gov.uk](http://www.medical-devices.gov.uk)) carried out tests on TETRA handsets and found that 47% were found to cause interference problems, 23% of these were seen as serious, including effects on heart pacemakers and hearing aids. The Royal Society of Canada ([www.rsc.ca/english/Rfreport.pdf](http://www.rsc.ca/english/Rfreport.pdf)) concluded that there are potential risks to the eyes, with little or no risk assessment having been carried out. Use of mobiles by people with pacemakers can result in unpleasant sensations such as heart palpitations. Pacemakers equipped with defibrillators may also cause harmful electrical pulses in the heart when exposed to mobiles.

Newer pacemakers are equipped with RF feed-through filters incorporated into the internal circuitry, which Censi (2007) believes as a result of a literature review (see bar graph below), gives the pacemaker protection from interference.



We understand from a personal communication that mobile phones can affect baby monitoring equipment and drips in hospitals. In a study looking at patient's heart rates when using exercise test equipment, electromagnetic interference from a charging mobile phone connected to the same socket as the exercise machine changed the recording of a patient to that of pseudosinus tachycardia at approximately twice the rate of actual basal heart rate (Aliyev 2010).

Apparently some police officers were required to take their TETRA handsets home to re-charge the batteries. This resulted in several members of different families suffering from epileptic attacks, some for the first time as they pass by the equipment on charge. After 12 months use by the Lancashire police, nearly two hundred instances of ill-health were reported by officers attributed to electromagnetic fields from the new TETRA equipment, including migraines, nausea, deafness, nose bleeds and fatigue.

We understand from Andrew Goldsworthy, a retired University lecturer, that the biological mechanism underlying the effects that some people report as a result of using the handsets can be explained (at least in part) by the following: *"The pulse frequency used in TETRA handsets is very close to the ion cyclotron resonance frequency for potassium which is especially good at giving biological effects. Potassium is by far the most abundant positive ion in living cells. Exposure at its resonant frequency increases its chemical activity, which enables it to drive structural calcium from cell membranes and make them more prone to "accidental" tearing. When it occurs in brain tissue it's quite likely to generate false action potentials. This would degrade the signal to noise ratio of the brain, reduce its ability*

*to respond appropriately to stimuli and be a contributory factor to many cellphone-related automobile accidents”.*

He continues *“Electromagnetic fields of the right amplitude and frequency selectively remove structural calcium from cell membranes, which weakens them and makes them more prone to temporary pore formation. When this occurs in excitable nerve cells it could promote the generation of spurious action potentials by direct depolarisation and/or calcium ingress from the outside and intracellular stores. This could account for many of the symptoms of electrosensitive people from headaches to pins and needles. Calcium ingress into the cytosol in ordinary cells would interfere with cell signalling and increase the rate of specific aspects of metabolism that they are programmed to carry out. It could increase the rate of healing of injured tissues or promote the growth of cancer cells – both good and bad effects of electromagnetic exposure. For more discussion of this topic see Chapter 11 of “Plant Electrophysiology – theory and Methods” ed. A Volkov.*

He also says that exposure to the ion cyclotron resonance frequency for calcium (32 Hz in the Earth’s magnetic field) gives opposite biological effects to 16 Hz (the potassium resonant frequency). If there are any adverse effects of weak electromagnetic fields on human or animal health, it should be possible to reverse them by simultaneous exposure to 32 Hz. Where people are particularly sensitive to mobile phone pulse frequencies near 16 Hz (e.g. TETRA at 17.6 Hz) it should in theory be possible to partially mitigate these effects by attaching a strong permanent magnet to the handset. This would shift the resonant frequency of the potassium ions in the brain to a higher value (the resonant frequency is directly proportional to the strength of the local DC field) and make them no worse than regular mobile phones.

British police forces are being equipped with smartphones. These will enable them to identify residents in a particular street of interest to them, and other information relevant to them. There may be problems with inadequate mobile bandwidth and security. The take up rate has been about 85%.

### **Legal Viewpoints?**

In May 2005, Sharesa Price was awarded \$30,000 to pay her medical bills and other expenses, when a judge was convinced her brain tumour was caused by radio-frequency radiation from her occupational mobile phone use several hours a day.

In December 2009, a judge on a Labour Tribunal recognised the occupational origin of National Public Insurance Institute employee Innocenzo Marcolini who developed a tumour on his trigeminal nerve, having worked for long hours using a mobile phone and a cordless phone. He is now 80% disabled as a result of this. The employer is to pay all court costs. This judgement makes it possible for employees in Italy to insist on the supply of a corded phone and to advise their employer that they are legally liable for future damages should they insist on the use of a cordless phone. This ruling, if challenged in court, may apply to other EU countries. The Consumer Centre in South Tirol advises everyone to insist on a written declaration regarding the use of telecommunication equipment which expressly states that the employer takes all responsibility for any future medium or long term consequences.

The legal departments of mobile phone manufacturers have inserted a warning about holding the phone against your head or body into the fine print of the slip inside the phone packaging. The chances are that this will be thrown away with the rest of the packaging. Iphones are to be kept at least 5/8 inch away from the head and Blackberrys should approach no closer than an inch.

## The environmental impact of the technology

Manufacturing phones or cases is not energy-efficient and disposal is becoming an ever-increasing problem. According to the Express in December 2009, 1,700 unwanted mobile phones are discarded in the UK alone, every hour. It is estimated that the life of a mobile phone is approximately 18 months before it is replaced with a newer model. Phones contain some elements that are hazardous in disposal. All batteries usually contain mercury, cadmium, lithium and other toxic, non-biodegradable metals that can affect water supplies from landfill. The cadmium from one phone battery leaking into the water table could contaminate 600,000 litres of water. Some of the telecommunications companies have a recycling policy. We suggest that you bear this in mind before purchasing a phone with the ability to pollute, and buy accordingly. We do not know what their recycling methods are, but trust that they respect the environmental impact that thoughtless disposal of such material could have.

Many charities raise funds by recycling mobile phones. If you are concerned about whether they are recycling the materials or merely redistributing the phones, contact the charity of your choice to find out.

One of the principal recycling schemes is Fonebak, [www.fonebak.com](http://www.fonebak.com). They also say they give donations to the Children in Need appeal. Fonebak extract and reuse the valuable or toxic metals, remake some phones for resale in less industrially developed countries, and burn the casings to make more energy.

When the European Commission unveiled proposals to deal with electronic waste, the main association for American companies operating in Europe criticized the draft laws. If the E.C. succeeds in regulating electroscrap in Europe, then pressure will rise to do the same in the United States. US manufacturers are complaining that regulations with teeth in them would "*inhibit free trade*".

Tantalum, used in mobile phone technology, is made from the radioactive mineral ore Coltan. In parts of Africa and Thailand, the extraction of Coltan has caused problems by removing valuable resources without compensation to the groups of local inhabitants. Because of its value and the likelihood of theft, this mineral ore is being kept in living quarters and there has been an increase in children born with deformities. Tantalum minerals are also mined in Australia, Brazil, Canada, China and Mozambique. However, we have to keep the issue in perspective. Although Coltan is mined and made into tantalum for mobile phones, computers, DVD players and video games systems also use tantalum.

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