Demystifying Radiation

Myths Vs Facts of Radiation in our lives

Printed by Indus Towers in the interest of public safety.
Radiofrequency (RF) is an abstract subject and is not easily understood by people. The term ‘radiation’ often conjures fear and scare. A tremendous amount of publicity generated in the mass media has also caused great concern among members of the public.
International Agency for Research on Cancer (IARC) completed a cancer hazard assessment for RF signals, including those from mobile communications, broadcast services, microwaves and has classified radiofrequency electromagnetic fields as ‘possibly carcinogenic to humans (IARC Group 2-B’).

‘Possible’ carcinogenic to humans has been given to 240 other agents, please see Group 2-B for more examples.

<table>
<thead>
<tr>
<th>Class</th>
<th>Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (Carcinogenic)</td>
<td>Asbestos; Ionising Radiation; Tobacco</td>
</tr>
<tr>
<td>Group 2-A (Probable, &gt;50% risk)</td>
<td>Formaldehyde; Styrene; UV Radiation</td>
</tr>
<tr>
<td>Group 2-B (Possible, &lt;50% risk)</td>
<td>Coffee; Pickled Vegetables; Lead; Engine exhaust; Pesticide DDT; RF</td>
</tr>
</tbody>
</table>

WHO Fact Sheet – Mobile phones, June 2011
‘To date, research does not suggest any consistent evidence of adverse health effects from exposure to radiofrequency fields at levels below those that cause tissue heating.’

WHO Fact Sheet - Base stations, May 2006
‘The levels of RF exposure from base stations and wireless networks are so low that the temperature increases are insignificant and do not affect human health’.
Relevant Points

We are surrounded by radiating elements in our daily lives. E.g. hair dryers, TVs, microwave ovens, radios, remote controls. Even natural sunlight has ultra violet rays.

What is popularly known as mobile phone radiation is the same as radio waves. It is through these radio waves that television and radio stations broadcasting towers transmit images and sound to televisions and radios.

RF radiation emitted by Mobile Communications systems lie in the non-ionising part of the electromagnetic spectrum and thus do not have enough energy to cause any genetic damage.

The intensity of radiofrequency radiation from base stations are less than one thousandth of those from mobile phones and are generally much less than those from the local radio and TV stations.

To date, there is inconclusive scientific evidence to prove that the mobile phone system can lead to cancer or a variety of other health effects, including headaches, dizziness, memory loss or birth defects.
Introduction

With the technology rapidly advancing, mobile phone users and people living within close range of the mobile phone base stations have become increasingly concerned over the potential harmful effects of radiofrequency radiation produced by these devices to their health.

There is a great deal of misunderstanding and misinformation on the issue of safety and radiation. This booklet endeavors to promote a better understanding of what is known and not known about radiofrequency radiation, as well as to separate the myths from the facts.

The telecommunications industry is experiencing a robust growth on a global scale. Since the introduction of mobile phones in the mid-1980s, there has been a significant increase in the number of mobile phone users and installations of base stations. As of August 2011, statistics from the Wikipedia show that there are over 1 billion subscribers in India alone.

Mobile phones, sometimes known as cellular phones or handsets, form an integral part of modern telecommunications and are fast becoming a social lifestyle. We cannot even begin to think of a life without our phones. In some parts of the world, they are the most reliable or the only phones available. In others, mobile phones are very popular because they allow people to maintain constant and continuous communication without hampering their freedom of movement.

The growth in mobile networks over the next few years will come from remote parts of the world. Moreover, the service providers are under tremendous pressure to deliver the solutions in an efficient manner and somehow make network available. Not only does it have to be available, it must be up and running 24X7 because it is an essential service. No other service, be it healthcare or basics like water supply is available 24 hours a day.
Recently World Health Organization (WHO), wrote a letter to Municipal Corporation of Delhi (MCD), wherein they have addressed most of the health related issues.

Cancer
Current scientific evidence indicates that exposure to RF fields, such as those emitted by mobile phones and their base stations, is unlikely to induce or promote cancers. Several studies are under way to determine whether the results of some studies on animals have any relevance to cancer in human beings. Recent epidemiological studies have found no convincing evidence of an increased cancer risk or any other disease with mobile phone use.

Traffic accidents
Research has clearly shown an increased risk of traffic accidents, some 3-4 times greater chance of an accident, when mobile phones (either handheld or with a "hands-free" kit) are used while driving.

Electromagnetic interference
When mobile phones are used close to some medical devices (including pacemakers, implantable defibrillators, and certain hearing aids) there is the possibility of causing interference with their operation. There is also the potential of interference between mobile phones signals and aircraft electronics.
Demystifying Radio Waves

What is popularly known as mobile phone radiation is the same as radio waves.

Radio waves are a form of electromagnetic waves. It is by using radio waves that television and radio stations broad-casting towers transmit images and sound to televisions and radios.

The same is the case with communication system for police and fire brigade, military radars and communication equipment for aircrafts, ships and satellites.

To ensure that it is Period-One State (P1) that comes out of the transistor radio – and not the police’s internal conversation – different frequencies are used. Mobile phones also use radio waves to transmit between mobile antennas and phones.

Since the beginning of time humans have been surrounded by electromagnetic waves of many different frequencies. The sun’s visible light is part of the electromagnetic waves. 100 years ago humans started using waves for radio broadcasting and 50 years ago for television. More and more waves are used for the shown purposes.

Food & Drug Administration (FDA)

The scientific evidence does not show a danger to users of wireless phones, including children and teenagers.
What are Electromagnetic Fields (EMF)?

Electric and magnetic fields (EMF) are invisible lines of force that surround any electrical device.

Power lines, electrical wiring, telecommunication equipments and electrical equipment all produce EMF. The electric field strength is measured in units of volts per meter (V/m).

Magnetic fields result from the flow of current through wires or electrical devices. Magnetic fields are measured in units of gauss (G).

The power radiated by a telecommunication antenna has both Electric and Magnetic fields.

- **Electric Field**
  - Produced by voltage
  - Lamp plugged in but turned off. Voltage produces an electric field.

- **Magnetic Field**
  - Produced by current
  - Lamp plugged in and turned on. Current produces a magnetic field also.

**DEPARTMENT OF TELECOMMUNICATIONS, INDIA (DoT)**

We do not have any authentic information from any study or report about health hazards of mobile phones or from towers installed for purpose of providing mobile telephone services.
Non-ionizing Radiation

Radio waves for mobile phones which belong to the lower frequency band have very low energy content. Therefore the waves are not strong enough to remove electrons from atoms or molecules and thus cause ionization. Radio waves can therefore not alter a molecule’s basic structure. They belong to the part of the electromagnetic spectrum called non-ionizing.

The low frequency of the non-ionizing radiation means that a molecule is not fundamentally changed. But when the waves become very powerful they can heat a body up. In connecting with mobile towers the heating does not take place until you move unnaturally close to the source. The international levels are set far below the heating point.

Ionizing Radiation

This belongs to the higher frequency range – e.g. x-rays and gamma radiations. Frequent and long duration use of the ionizing radiation can affect genes and DNA molecules.

Ionizing radiation (30,000 THz - ) eg. soft and hard x-ray radiation (x-ray equipment and technical scientific instruments), gamma radiation (radio activity, space outside the atmosphere).

WORLD HEALTH ORGANISATION (WHO)

Present scientific evidence does not indicate the need for any special precautions for the use of mobile phones. If individuals are concerned, they might choose to limit their own or their children’s RF exposure by limiting the length of calls, or by using “hands-free” devices to keep mobile phones away from the head and body.
We are surrounded by radiating elements from all sides in day to day life. Microwave oven emission limit is 50W/Sq meter at 5cm from oven.

GSM & CDMA bands are from 800MHz to 2000 MHz range, while microwave band are between 2GHz to 28GHz.

Let us understand Electromagnetic Fields (EMF)

The Electromagnetic Spectrum

<table>
<thead>
<tr>
<th>Static Electric &amp; Magnetic Fields</th>
<th>Alternating Electric &amp; Magnetic Fields</th>
<th>Appliances (Hairdryers/Televisions)</th>
<th>Radio Frequency, Microwaves and Mobile Devices</th>
<th>Infrared</th>
<th>Visible Light</th>
<th>Ultraviolet Light</th>
<th>X-Rays</th>
<th>Nuclear</th>
</tr>
</thead>
</table>

Non-Ionizing vs Ionizing

- **Non-Ionizing**
  - Zero Frequency to High Frequency

- **Ionizing**
  - Zero Frequency to High Frequency
Radio waves have different frequencies that are measured in hertz (Hz)

Low frequency (0 Hz – 9 kHz)
High voltage (mains) viewing screens and electrical appliances (hair dryers, light bulbs, ovens, toasters, computers)

Radio waves (9 kHz – 3,000 GHz)
eg. Radio and television broadcasting towers, mobile phone (450 MHz – 2 GHz), microwave ovens (typically 2.45 GHz), radio links (up to 40GHz)

Light (3 THz – 3,000 THz)
Infrared radiation (remote control for electrical appliances) visible light (incandescent lamps) and ultraviolet radiation (the sun)

Two factors must be clarified when discussing whether electromagnetic waves affect humans: What is the frequency and power?

In connection with radio waves there is talk of power density. The power density depends on the transmitter’s power, antenna design and location and distance from the antenna. It is the same as with sound: When you move away from a person who is talking to you the sound weakens. In the same way the power density becomes smaller when you move away from the antenna.

Power density is specified in watt/m².

Overview of radio waves and transmit power typically used

The frequency indicates microwave oscillations per second

<table>
<thead>
<tr>
<th>KiloHertz (kHz)</th>
<th>MegaHertz (MHz)</th>
<th>GigaHertz (GHz)</th>
<th>Terahertz (Thz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 Hz</td>
<td>1,000,000 Hz</td>
<td>1,000,000,000 Hz</td>
<td>1,000,000,000,000 Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Media</th>
<th>Frequency</th>
<th>Transmit Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walkie-talkie</td>
<td>27 MHz</td>
<td>4 W</td>
</tr>
<tr>
<td>TV + FM- radio</td>
<td>50-960 MHz</td>
<td>70,000 W</td>
</tr>
<tr>
<td>Remote control</td>
<td>433 MHz</td>
<td>0.001 W</td>
</tr>
<tr>
<td>Tetranet (police &amp; fire brigade)</td>
<td>160 and 450 MHz</td>
<td>25 W</td>
</tr>
<tr>
<td>GSM</td>
<td>900 and 1,800 MHz</td>
<td>27 W</td>
</tr>
<tr>
<td>UMTS</td>
<td>2,000 MHz</td>
<td>20 W</td>
</tr>
<tr>
<td>WLAN</td>
<td>2,400 MHz</td>
<td>0.1 W</td>
</tr>
<tr>
<td>Mini links</td>
<td>38 GHz</td>
<td>7 - 0.5 W</td>
</tr>
</tbody>
</table>
### Myths About Mobile Phones, Base Stations & Telecommunication Towers

<table>
<thead>
<tr>
<th>MYTH</th>
<th>FACT</th>
<th>MYTH</th>
<th>FACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile phones cause brain cancers. Look at all those people who used mobile phones and are ill.</td>
<td>Despite many studies, there is no scientific evidence to establish the link.</td>
<td>It is the base stations that are really dangerous.</td>
<td></td>
</tr>
<tr>
<td>Mobile phones are so powerful that they literally cook your brain.</td>
<td>Mobile phones typically have an output of less than 1 watt that may cause heating in the brain of fractions of a degree, less than normal exercise.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>You are safer using a mobile phone in a car because it shields you from the radiation.</td>
<td>Phones automatically increase their output in a car to overcome the shielding. A ‘car kit’ often uses an external antenna that will reduce the power levels.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using them in a car does not affect your driving skills.</td>
<td>You are 4 times more likely to crash because of divided attention, and it is similar to drunk-driving.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Base Stations & Telecomunication Towers

- **At the ground level**, the intensity of radiofrequency radiation from base stations is less than one thousandth of those from mobile phones and are generally much less than those from the local radio and television stations.
- The cases of brain cancer are increasing as more people use mobile phones.
- Using a mobile phone gives you headaches.
- **People** get headaches without using mobile phones, too – there is no evidence of a direct link.
- Nobody is really investigating the dangers.
- The World Health Organization and many government agencies are coordinating scientific studies to investigate these health effects.
How does a mobile phone system work?
The individual mobile phone operates by communicating with a fixed installation known as a base station or a telecommunications tower. Since the mobile phone and its base station is a two-way radio, they produce radiofrequency (RF) radiation as a means of communicating and expose the people near them to RF radiation.

Why is there a great concern on the health effects of a mobile phone system?
Radiofrequency is an abstract subject and is not easily understood by people. The term ‘radiation’ often conjures fear and scare. A tremendous amount of publicity generated in the mass media has also caused great concern among members of the public.

Millions of people around the world use mobile phones as a communication tool every day. Base stations or telecommunication towers are continuously being erected. Because of this, scientists worldwide are concerned about the potential health risks associated with the use of this device. Even small adverse effects on health could have major public health implications.

FAQs

How does radiation behave?
Radiation behaves in the same manner as light. It travels in a straight line and when it collides with an object, it can do three things — it can pass right through (transmission), it can bounce off (reflection), and it can be absorbed. Its energy reduces as it moves away from its sources where radiation is produced.

Is natural radiation dangerous?
The sun is familiar to us as it produces infrared radiation, visible light, and ultraviolet light. The other sources are cosmic radiation that consists of high energy particles and rays that originate from outside our earth, terrestrial radiation that comes from naturally occurring radioactive materials in the earth’s crust, and internal radiation from radioactivity that is naturally present in our bodies.

Of these, only the ultraviolet light from the sun can be considered ‘dangerous’. Over-exposure to the sun’s ultraviolet light can cause premature aging of the skin and cause sunburn, which has been linked to skin cancer. Although the nature of cosmic, terrestrial, and internal radiation is inherently hazardous and can cause cancer, these sources are not normally dangerous to us as the levels present naturally are sufficiently low that the risk is negligible.

What are mobile phones? Do they emit large quantities of RF?
A mobile or cellular phone is a low-power, single-channel, two-antenna way radio. It contains both a transmitter, transmitter and receiver. It emits RF radiation to transmit information to the base station. It also acts like a receiver of information, in a similar manner as a transistor radio. The
handset battery limits the power of transmitted radiation, which is similar, if not smaller than, that of a torchlight. The radiation emitted by the antenna is insufficient to cause any significant heating of tissues in the ear or head, although a rise in skin temperature may occur as a result of placing the mobile phone too close against the ear or head thus restricting the airflow.

Are there any other RF sources that I am exposed to?
Yes. In many urban areas, television and radio broadcast antennas commonly transmit higher RF radiation levels than the mobile phone base stations. You are exposed to RF radiation originating from paging and other communications antennas such as those used by the fire, police and emergency services, that operate at similar power levels as base stations, and often at a similar frequency.

What are mobile phone base stations and how do they work?
Mobile phone base stations are also known as base transceiver stations (BTS) or telecommunications towers. They are low-power, multi-channel two-way radios. Antennas, which produce RF radiation, are mounted on either transmission towers or roof-mounted structures. These structures need to be of a certain height in order to have a wider coverage. When you communicate on a mobile phone, you are connected to a nearby base station. From that base station your phone call goes into the regular fixed-line phone system.

As the mobile phones and their base stations are two-way radios, they produce RF radiation to communicate and therefore expose the people near them to RF radiation. However, as both the phones and the base stations have low-power (short range) transmitters in them, the RF radiation exposure levels are generally very low.

Are there health risks associated with living or working near a base station?
The consensus of the international scientific community is that the power from these mobile phone base station antennas is far too low to produce health risks as long as people are kept away from direct contact with the antennas. It is the antennas that you need to keep your distance from and not the towers that hold the antennas.

What are the safety standards that apply to mobile phones and base stations?
There are a number of safety factors which are adopted by the service providers while installing a telecom tower. The towers installed are certified for structural safety by the reputed engineering institutes. Necessary safety precautions are taken against lightning, fire etc. by putting lightning arrestor on the tower and taking necessary precautions against fire and other damages.

Moreover, DoT has also adopted the ICNIRP Guidelines for the telecom sector in India, bringing it at par with the International standards on the health and environment issues. All the mobile towers are certified ICNIRP compliant by the operators.

**DOCTORS’ QUOTES**

Although there has been much speculation and some research, as yet there is no conclusive data about any confirmed biological hazard from electromagnetic radiations emitted from mobile phone/towers. Further research is warranted to prove or disprove either way.

Dr. S.K. Chug, Senior Consultant Cardiology Escorts Heart Institute and Research Centre, New Delhi HOD, Escorts Kalyani Heart Centre, Gurgaon.
Is there a scientific basis for RF safety standards?
Yes. Over the past few decades, scientists have been researching the biological effects of RF radiation on animals and humans. The results were published in scientific journals and have been extensively reviewed by international organizations.

What are the international organizations doing regarding the health effects of RF radiation?
Public concern in many countries regarding mobile phones and base stations has resulted in a number of international and national organizations and independent expert groups being requested by governments to carry out detailed reviews of the research literature.

The World Health Organization International Electromagnetic Fields (EMF) Project was started in 1996. An important result of this work has been the development of a detailed agenda of research needs, which has driven the establishment of new research programmes around the world. It aims to harmonize the safety standards for all countries in the world. The Project has also helped develop a series of public information documents on EMF issues.

What are the effects of RF radiation?
RF can cause the heating of tissues that leads to an increase in the body temperature. This is known as the thermal effect. Although the body has its effective ways of regulating its temperature, nevertheless, if the RF exposures are too high, one can reduce impact by using handsfree, switching between the ears and using speaker phones.

There is some discussion about other effects caused by RF other than by thermal effect. However, no evidence is established yet. The scientific community and international bodies acknowledge the need for further research to improve our understanding in these areas. At the moment, there are insufficient and inconclusive scientific findings to prove any adverse health effects caused by RF.

How safe is the mobile phone system? Can it cause cancer and other illnesses?
Some studies have examined the possibility of a link between RF exposure and cancer. The results to date have been inconclusive. While some experimental data might suggest a possible link between exposure and cancer formation in animals exposed under specific conditions, the results have not been independently reproduced. In fact, other studies have failed to find evidence for a causal link to cancer or any related condition. Further research is underway in several laboratories to help resolve this issue.

In recent years, publicity, speculation and concern over claims of possible health effects due to RF from base stations and mobile phones have prompted many research organizations to investigate its potential health effects. To date, there is inconclusive scientific evidence to prove that the mobile phone system can lead to cancer or a variety of other health effects, including headaches, dizziness, memory loss or birth defects.

DOCTORS’ QUOTES
RF Communication is used to transmit the digitalized sound from the outer speech processor to the implanted device in the human skull. The technology has been used to treat patients for last 30 years and there has been no problems reported. All the implants are US FDA approved and European CE certified.

Dr. J.M. Hans, Padmashree recipient by Hon’ble President of India, Cochlear implant surgeon, (Ex Vice President CIGI), Director – Dept. of ENT & Cochlear Implant Surgery, Primus Super Speciality Hospital, New Delhi

Public concern in many countries regarding mobile phones and base stations has resulted in a number of international and national organizations and independent expert groups being requested by governments to carry out detailed reviews of the research literature.
What is Specific Absorption Rate (SAR)? How can I use it?

SAR is a measure of the amount of RF energy that is absorbed by the tissues in the human body. It indicates the average rate at which energy is absorbed for each kilogram of tissue (watts per kg). This measurement is used to determine whether a mobile phone complies with the safety guidelines.

The exposure limit takes into consideration the body’s ability to remove heat from the tissues that absorb energy from the mobile phone and is set well below levels known to show biological effects.

The U.S. Federal Communications Commission (FCC) limit for RF radiation exposure from mobile phones is set at a SAR of 1.6 watts per kilogram (1.6 W/kg). ICNIRP recommends that the localized SAR in the head be limited to 2 W/kg averaged over any 10g mass of tissues in the head (0.02 W absorbed in any 10g mass of tissue in the head). A SAR of 4W/kg is associated with a temperature rise in humans of a fraction of a degree Celsius.

Where can I obtain SAR value for my mobile phone?

Mobile phone manufacturers must ensure that their products comply with the SAR levels that have been set as safe although there is a range of SAR values in the products sold. You may wish to take the SAR value into consideration when choosing a mobile phone, hence the move to provide this information.

What steps can I take to reduce my exposure to RF radiation from my mobile phone?

If you are concerned about avoiding even potential risks, here are a few simple steps that you can take to help minimize your exposure to RF radiation. Since time is a key factor in how much exposure a person receives, the shorter the time you spend on a mobile phone, the smaller the RF radiation exposure. You could use a hands-free kit or use a mobile phone connected to a remote antenna to increase the distance between your body and the source of the RF radiation, since the exposure level drops off dramatically with distance. Again, the scientific data does not demonstrate that mobile phones are harmful. However, if you are concerned about the RF radiation exposure from these products, you can use measures described above to reduce your RF radiation exposure from mobile phone use.

DOCTORS’ QUOTES

Dr. (Lt Col) VP Singh, Senior Consultant, Surgical Oncology, Indraprastha Apollo Hospitals, MS, FRCS, (Glasgow) FUICC

There is no conclusive proof that mobile radiation causes cancer. There have been a lot of studies that has been done but no evidence suggests that radiation from mobile phones and mobile towers cause brain tumour.

Dr. Vijaylaxmi, Department of Radiation Oncology & Department of Pathology, University of Texas Health, Science Center, San Antonio, Texas

The results from several of my acute and chronic exposure studies have revealed that RF radiation emitted from mobile phones does not have sufficient energy to cause ‘breakage’ in the genetic material in human and animal cells. Researchers in other parts of the world have also reported similar observations.
What is the advice for children using mobile phones?

The scientific evidence does not show a danger to mobile phone users, including children and teenagers. If you want to take steps to lower the exposure to RF radiation, the measures described above could also apply to children and teenagers. Reducing the time of mobile phone use and increasing the distance between the user and the RF radiation source will reduce the RF radiation exposure.

In December 2000, the United Kingdom government recommended limiting the use of mobile phones by children as a precautionary measure. It was, however, noted that no evidence exists to suggest that using a mobile phone causes brain cancers or other health effects. The U.K. Stewart Report states:

‘If there are currently unrecognized adverse health effects from the use of mobile phones, children may be more vulnerable because of their developing nervous system, the greater absorption of energy in the tissues of the head, and a longer lifetime of exposure. In line with our precautionary approach, we believe that the widespread use of mobile phones by children for non-essential calls should be discouraged. We also recommend that the mobile phone industry should refrain from promoting the use of mobile phones by children.’

So why is anyone still worried?

It is only natural for the members of the public to worry whenever there is a health scare as this is how they perceive risk. The tremendous amount of publicity on this health issue has also caused further confusion and uncertainty. A few years back, experiments conducted on animals suggested that mobile phone radiation might cause cancer or damage DNA. While these findings have been reported, further animal studies have also suggested that RF radiation is harmless.

Secondly, science is unable to prove that something is absolutely safe and harmless. And scientists are seldom able to say the word ‘never’ an assurance that the public wants.

Thirdly, as health scare has always acquired a life of their own, once it is suspected that mobile phones could be dangerous, many people would come forward to heap blame on them as the probable cause for the death of their loved ones or any illness that they may have. Although there is inconclusive evidence, no amount of proof of research will likely erase such doubts.

In the 1960s, the public were suspicious and unduly worried about the x-ray exposure from their colour television. In the 1980s, electromagnetic fields from computer terminals have been erroneously linked as the main cause of miscarriages, birth defects and other health problems. Again, these claims have been overturned. In the 1990s, with the internet revolution, experts have begun to raise their concerns over the internet addiction among its users.
There are many informative and authoritative web sites maintained by international organizations and government agencies where you can get further information.

**These include:**

The World Health Organization (WHO). The World Health Organization established the International EMF Project in 1996 to assess the scientific evidence of possible health effects of electric and magnetic fields, including the radiofrequency fields from mobile phone. They have a fact sheet on Electromagnetic fields and public health that deals with issues relating to radiation around mobile phones and base stations available at [http://www.who.int/inf-fs/en/fact193.html](http://www.who.int/inf-fs/en/fact193.html)

Other information on the project can be found at [http://www.who.int/peh-emf/en/](http://www.who.int/peh-emf/en/)


The International Agency for Research on Cancer (IARC) INTERPHONE project is described in [http://www.iarc.fr](http://www.iarc.fr)

New information leaflets published by the U.K. Department of Health can be found at: [http://www.doh.gov.uk/mobilephones/index.htm](http://www.doh.gov.uk/mobilephones/index.htm)

Independent Expert Group on Mobile Phones Report (also known as the Stewart Report) – this report was published in May 2000 by an independent expert group established by the U.K. government. [http://www.iegmp.org.uk](http://www.iegmp.org.uk)


The Institute of Electrical and Electronics Engineers (IEEE) Online journal Spectrum article “Are mobile phones safe?” [http://www.spectrum.ieee.org/publicfeature/aug00/prad.html](http://www.spectrum.ieee.org/publicfeature/aug00/prad.html)

IEEE Committee on Man and Radiation (COMAR) also publishes reports on the safety and human exposure to electromagnetic fields. [http://www.seas.upenn.edu/~kfoster/comar.htm](http://www.seas.upenn.edu/~kfoster/comar.htm)

A consumer update on mobile phones produced by the United States FDA is available at [http://www.fda.gov/cellphones/](http://www.fda.gov/cellphones/)


**INTERNATIONAL**


International Commission on Non-Ionizing Radiation Protection (ICNIRP) [http://www.icnirp.de](http://www.icnirp.de)
Radiation emitted by mobile communications systems lie in the non-ionising part of the electromagnetic spectrum and are not capable of causing any genetic damage. The RF emissions from mobile phones and base stations are some hundreds of times lower than the levels at which the first health effects begins to be established. Also output power of mobile phones is less than 1 watt (typically is in the range of 0.2 to 0.6 watts) which is far lower than the emission levels that emanate from the microwave of even the radio.

For several decades extensive RF research has been undertaken by researchers of the highest integrity at various international organizations and general consensus of these studies does not demonstrate any substantial link between human health risk and the use of digital mobile phones or living near a base station.

Many expert panels have reviewed the large body of existing scientific literature and have consistently concluded that compliance with the existing science based ICNIRP standards is sufficient to protect public health. These reviews have concluded that for exposure to RF energy up to levels below the safety limits prescribed by international commission of ICNIRP and endorsed by WHO there is no substantive or convincing evidence of biological effects that could harm a person health, that is, ICNIRP guidelines are reliable safeguards for all segments of the population, including children.

All of the reviews of the last ten years by expert panels and government agencies looking into the health and safety of mobile communications have agreed that the scientific evidence does not demonstrate any health risk from the use of mobile phones for children. These include agencies like WHO, ICNIRP, the Health Council of the Netherlands, Food and Drug Associations (FDA), IEEE and many other international bodies.
In the 1960s, the public were suspicious and unduly worried about the x-ray exposure from their colour television. In the 1980s, electromagnetic fields from computer terminals have been erroneously linked as the main cause of miscarriages, birth defects and other health problems. Again, these claims have been overturned. In the 1990s, with the internet revolution, experts have begun to raise their concerns over the internet addiction among its users. Currently it is cell phones and radiation from towers.

Presently, no recognized expert is of the opinion that the radiation from television towers and other microwave-emitting antennas is linked to cancer. Yet, in many countries, ongoing campaigns have been carried out to stop these towers from being built.