# Public Health and Safety in the use of Mobile Communications

# Contents

# Introduction

**Mobile Telecommunications is a catalyst for growth**

Mobile services are already an everyday part of many people's lives. They are transforming the way we live, work and communicate, and helping change people's lives for the better by creating access to services and enabling economic development.

Across the world, mobile telecommunications has been recognised as a driver for speedy socio-economic development of a nation.

The Government of India also recognises that provision of world class telecommunications infrastructure has significantly contributed to the country's economic growth. The role of mobile telecommunications as a national growth engine is also exemplified through enhanced access to connectivity, better business productivity and a tool for individual and social empowerment.

In India, we already have almost 920 million subscribers. This means that today, around 79 out of every 100 people have access to mobile telecommunications. This represents a huge leap in connectivity as compared to 1994, when 8 out of every 1,000 people in the country had a telephone.

**Growth, and concerns**

The exponential growth in mobile services has also given rise to health concerns with regard to exposure to emissions from telecom towers and mobile phones.

There are millions of reports available on the internet on this subject, representing both sides of the debate. This leads to confusion amongst the common man and gives rise to the question…who does one believe and trust?

In the community of nations, there is today one global body, the World Health Organisation (WHO), which is responsible for providing leadership in health matters, monitoring and assessing health trends and shaping the global health agenda. In this booklet we have examined different concerns being expressed and then published what the WHO has said on the matter through periodically issued advisories. The relevant links to the WHO website have also been provided, so that readers can actually visit the WHO website and view the advisories before coming to any conclusion.

The following pages will take the reader through the basics of what are Electro Magnetic Fields (EMF), how mobile telecommunication services are provided, what are the safety standards for EMF, the latest scientific reviews, the views of some experts in this field  as well as address some of frequently asked questions and some  common myths and facts .

International bodies quoted, or referred to in this booklet include the following:

1) World Health Organisation (WHO)
2) The International Commission of Non-Ionizing Radiation Protection (ICNIRP)
3) International Agency for Research in Cancer (IARC)
4) The Independent Advisory Group on Non-Ionizing Radiation (AGNIR)

# What is EMF?

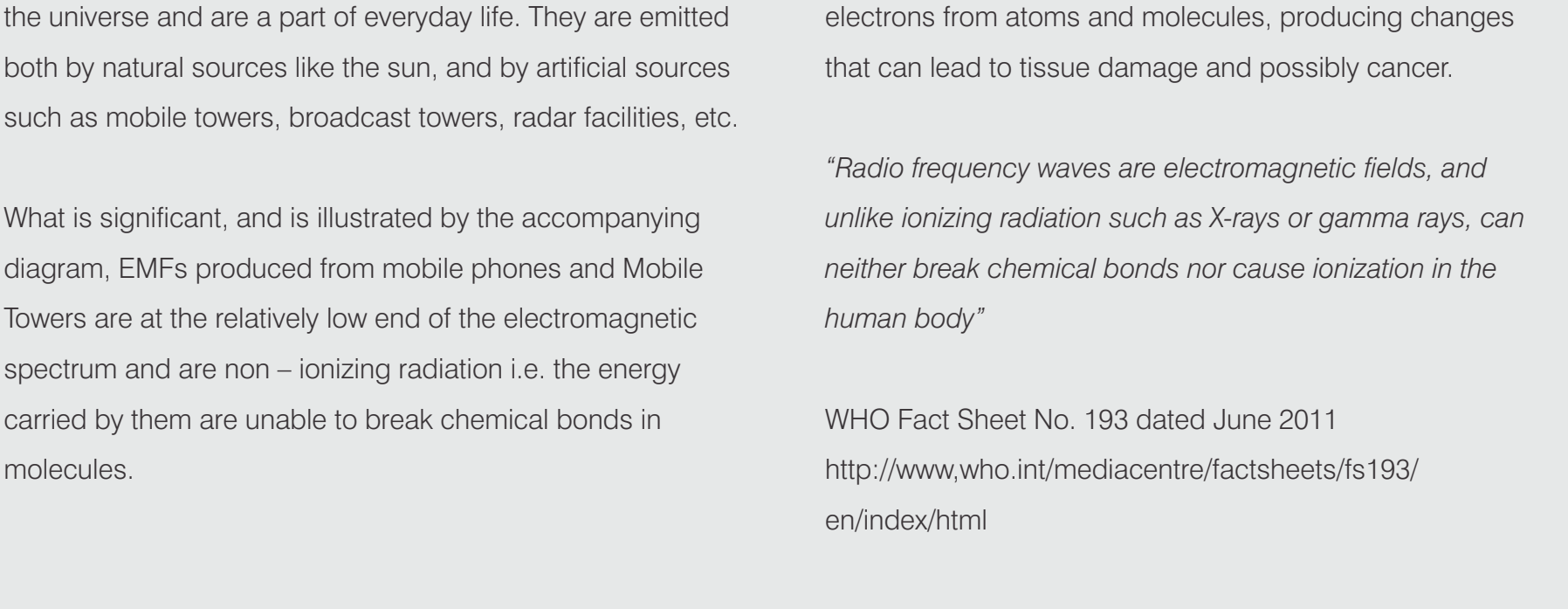
Electromagnetic fields have been around since the birth of the universe and are a part of everyday life. They are emitted both by natural sources like the sun, and by artificial sources such as mobile towers, broadcast towers, radar facilities, etc.

What is significant, and is illustrated by the accompanying diagram, EMFs produced from mobile phones and Mobile Towers are at the relatively low end of the electromagnetic spectrum and are non – ionizing radiation i.e. the energy carried by them are unable to break chemical bonds in molecules.

In contrast, ionizing radiation, such as X-rays can strip electrons from atoms and molecules, producing changes that can lead to tissue damage and possibly cancer.

*“Radio frequency waves are electromagnetic fields, and unlike ionizing radiation such as X-rays or gamma rays, can neither break chemical bonds nor cause ionization in the human body”*

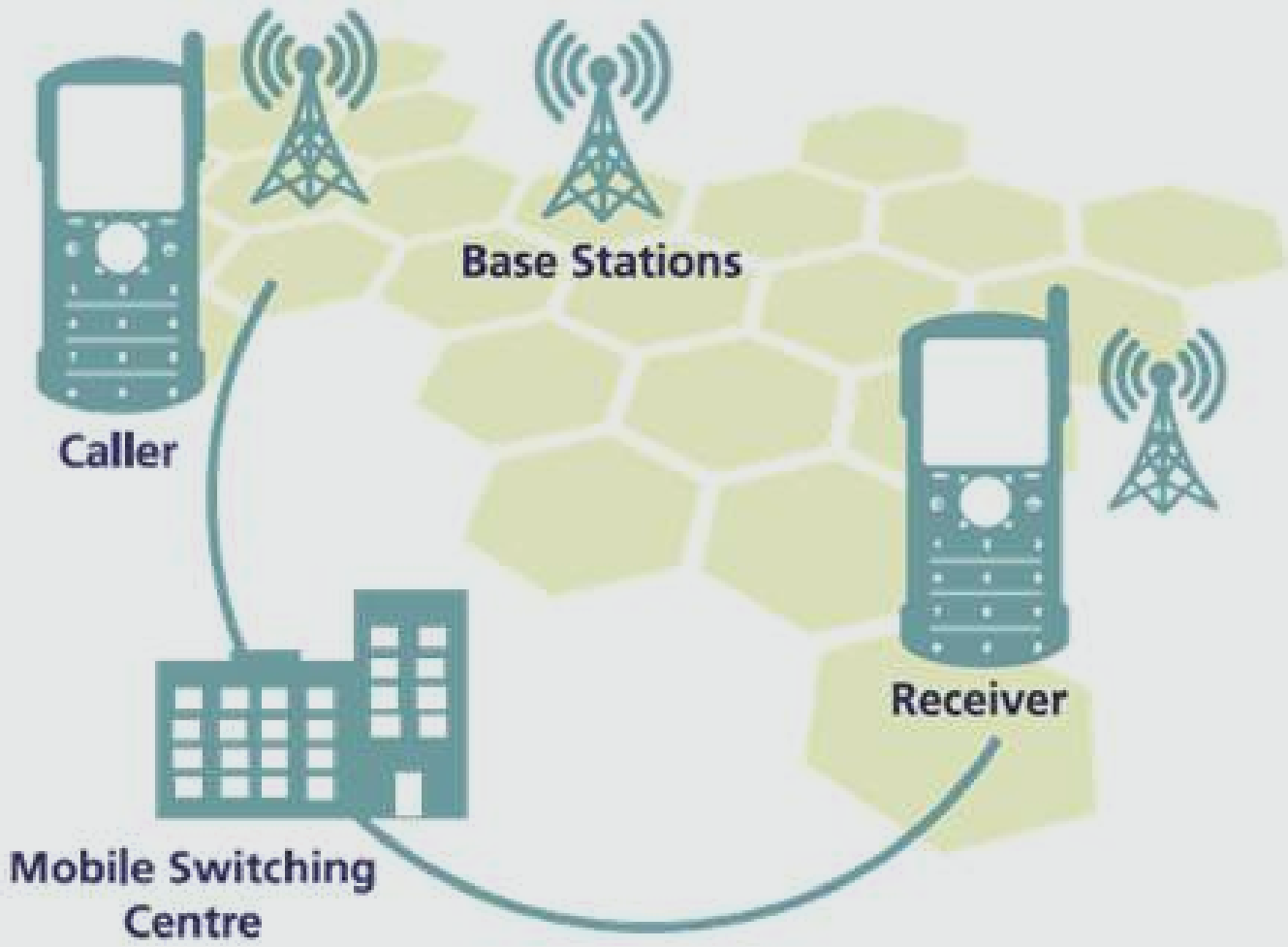
WHO Fact Sheet No. 193 dated June 2011
http://www,who.int/mediacentre/factsheets/fs193/en/index/html



# How does a mobile telecommunication service work?

From a user's perspective, the two important components of a network are the individual's mobile phone and the Mobile Tower with an antenna most often on a rooftop or mounted on walls of buildings. Mobile phones periodically detect and access the network from wireless signals from an antenna. The network is divided into geographic areas called cells, each of which is served by a Mobile tower or a base station. To communicate with each other, mobile phones and base stations exchange radio signals. The user connects to the base station via the mobile phone and the system ensures that the connection is maintained as the user moves from one cell to another. When a mobile phone is switched on, it responds to specific control signals from nearby base stations. Once it has located a suitable base station the phone initiates a network connection. Apart from when a call is being made or received, the mobile phone remains in standby mode. The mobile connection may also be set up within buildings using indoor antenna called "In building solutions" as is done in buildings which have a high density of users or where the signal coverage from the external base station is inadequate.

The level of the wireless signal has to comply with the minimum Quality of Service (QoS) levels specified by the Telecom Regulator.



# Safety standards for EMF

The International Commission of Non-ionizing Radiation Protection (ICNIRP) is a non–governmental organisation that is formally recognised by the World Health Organisation. ICNIRP in 1998 evaluated scientific results from all over the world and produced guidelines recommending limits on exposure. These guidelines are also regularly reviewed.

The ICNIRP guidelines include a significant safety margin. To illustrate, the ICNIRP 1998 guidelines show that even at 4W/kg, the whole body temperature rise is not sufficient to induce a temperature rise that affects health. Notwithstanding this, ICNIRP have specified that the exposure level should be limited to 0.08W/kg for the general public, which is a 50 times reduction factor. This factor is sufficient to protect all people, children, adults of various sizes and those people who, through frailty or illness, have bodies that are less able to control core temperature.

The ICNIRP guidelines are also reviewed regularly. In its 2009 review, ICNIRP has stated that for RF EMF, the organization concludes that "the scientific literature published since the 1998 guidelines has provided no evidence of any adverse effects below the basic restrictions and does not necessitate an immediate revision of its guidance on limiting exposure to high frequency electromagnetic fields."

90% of the countries that have adopted safety standards for EMF have adopted the guidelines set by ICNIRP for Base Stations.

*"Currently, two international bodies* [1,2] *have developed exposure guidelines for workers and for the general public, except patients undergoing medical diagnosis or treatment. These guidelines are based on a detailed assessment of the available scientific evidence."*

[1] International Commission on Non-Ionizing Radiation Protection (ICNIRP). Statement on the "Guidelines for limiting exposure to time-varying electric, magnetic and electromagetic fields (up to 300 GHz)", 2009.

[2] Institute of Electrical and Electronics Engineers (IEEE). IEEE standard for safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz, IEEE Std C95.1, 2005.

WHO Fact Sheet No. 193 dated June 2011

http://www,who.int/mediacentre/factsheets/fs193/en/index/html

# Some recent updates and developments

INTERPHONE Study May 2010: An international study, of almost 13,000 mobile phone users in 13 countries, conducted over 2000-2004, coordinated by the International Agency for Research on Cancer (IARC), publishing its findings in May 2010, concluding that: *"Overall, no increase in risk of glioma or meningioma (two most common types of rare brain tumours) was observed with use of mobile phones. There were suggestions of an increased risk of glioma at the highest exposure levels, but biases and error prevent a causal interpretation. The possible effects of long-term heavy use of mobile phones require further investigation."*

IARC Press Release May 2011: The International Agency for Research in Cancer Classification (IARC) which is a part of the WHO completed a cancer hazard assessment for radiofrequency signals, including those from broadcast services, mobile communications, microwaves and radar in May 2011 and in its Press Release dated 31 May 2011 classified radiofrequency electromagnetic fields as *"possibly carcinogenic to humans (IARC Group 2B), based on an increased risk for glioma, a malignant type of brain cancer, associated with wireless phone use."*

The Press Release issued by IARC on 31 May 2011, stated that *"The evidence was reviewed critically, and overall evaluated as being limited among users of wireless telephones for glioma and acoustic neuroma, and inadequate to draw conclusions for other types of cancers. The evidence from the occupational and environmental exposures mentioned above was similarly judged inadequate."*

Thus, evidence linking EMF emissions from Base Stations which come under the category of environmental exposure with cancer was judged to be "inadequate" by IARC. It is also important to note that the classification of "possibly" carcinogenic to humans, i.e. Category 2B has been given to 240 other agents, including the pesticide DDT, engine exhaust, lead and various industrial chemicals and in fact, even pickled vegetables and coffee.

WHO Fact Sheet June 2011: The World Health Organisation [WHO] Fact Sheet No193 on Mobile Phones dated June 2011: took note of the IARC Classification of May 2011 and the need for further study on this issue, but goes on to state that: *"A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use."*

The Fact Sheet states that *"A person using a mobile phone 30–40 cm away from their body – for example when text messaging, accessing the Internet, or using a "hands free" device – will therefore have a much lower exposure to radiofrequency fields than someone holding the handset against their head.*

*In addition to using "hands-free" devices, which keep mobile phones away from the head and body during phone calls, exposure is also reduced by limiting the number and length of calls. Using the phone in areas of good reception also decreases exposure as it allows the phone to transmit at reduced power."*

ICNIRP also reviewed the results of the INTERPHONE study stating *"ICNIRP recently published a review of the scientific evidence on the health effects of radio frequency exposure from mobile phones. We found the existing evidence did not support an increased risk of brain tumors in mobile phone users within the duration of use yet investigated."*

ICNIRP in a paper "Mobile Phones, Brain Tumours and the Interphone Study: Where Are We Now? *"In summary, Interphone and the literature overall have methodological deficiencies but do not demonstrate greater risk of either glioma or meningioma with longer or greater use of mobile phones, although the longest period since first use examined is <15 years."*, and *"Although there remains some uncertainty, the trend in the accumulating evidence is increasingly against the hypothesis that mobile phone use can cause brain tumours in adults."*

AGNIR Report April 2012: A Report by the Independent Advisory Group on Non-Ionizing Radiation (AGNIR) in April 2012 concluded that: *"There is increasing evidence that Radio Frequency Electromagnetic Field exposure below guideline levels does not cause symptoms and cannot be detected by people, even by those who consider themselves sensitive to RF fields. The accumulating evidence on cancer risks, notably in relation to mobile phone use, is not definitive, but overall is increasingly in the direction of no material effect of exposure."*

UK Health Protection Agency in their response to the AGNIR report says *"AGNIR's main conclusion is that, although a substantial amount of research has been conducted in this area, there is no convincing evidence that RF field exposures below guideline levels causes health effects in adults or children. These "guideline levels" are those of the International Commission on Non- Ionizing Radiation Protection."*

National Cancer Institute - reports that U.S. population data show no increase in brain cancer rates during period of expanding cell phone use. In a new examination of United States cancer incidence data, investigators at the National Cancer Institute (NCI) reported that incidence trends have remained roughly constant for glioma, the main type of brain cancer hypothesized to be related to cell phone use. The researchers found that while cell phone use increased substantially over the period 1992 to2008 (from nearly zero to almost 100 percent of the population), the U.S. trends in glioma incidence did not mirror that increase. Results of this study were published online March 8, 2012, in the *British Medical Journal.*
http://www.cancer.gov/newscenter/pressreleases/2012/GliomaCellPhoneUse

National Cancer Institute - Fact Sheet: Cell Phones and Cancer Risk
*"Studies thus far have not shown a consistent link between cell phone use and cancers of the brain, nerves, or other tissues of the head or neck."*
"..to date there is no evidence from studies of cells, animals, or humans that radiofrequency energy can cause cancer."
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones

The First International Study on use of Mobile phones and childhood brain cancer (CEFALO - Study of 1000 Children between 7 – 19 years diagnosed with Brain tumor in Denmark, Sweden, Norway and Switzerland) was published in the Journal of the National Cancer Institute in June 2011 and finds no overall evidence of increased risk of brain cancer. The Study concluded that *"The absence of an exposure response relationship either in terms of the amount of mobile phone use or by localization of the brain tumor argues against a casual association"*

AFSSE, the French Environment Health and Safety Agency notes that *"the general analysis of current scientific data on exposure to base station waves show no health risk linked to mobile phone base stations. …"*

Update on the Danish Cohort Study - In the latest research, published in the journal BMJ (British Medical Journal) in September 2011, researchers updated a previous study examining 358,403 cell phone users in Denmark from 1990 to 2007.

The study was conducted to investigate the risk of tumours in the central nervous system among Danish mobile phone subscribers. The research included all Danes aged greater than 30 and born in Denmark after 1925, subdivided into subscribers and non-subscribers of mobile phones before 1995.

The study concluded that Cancer rates in people who used mobiles for about 10 years were similar to rates in people without a cell phone.

UK Biological Effects Policy Advisory Group (BEPAG) of the Institution of Engineering and Technology (2012)

*"that the balance of scientific evidence to date does not indicate that harmful effects occur in humans due to low-level exposure to EMFs."*

*"In summary, the absence of robust new evidence of harmful effects of EMFs in the past two years is reassuring and is consistent with our findings over the past two decades. The widespread use of electricity and telecommunications has demonstrable value to society, including health benefits. BEPAG is of the opinion that these factors, along with the overall scientific evidence, should be taken into account by policy makers when considering the costs and benefits."*

http://www.theiet.org/factfiles/bioeffects/emf-position-page.cfm?type=pdf

# What the Experts have to say about EMF safety?

1) "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."

Dr. Vijayalaxmi
Department of Radiation Oncology,
University of Texas Health Science Center

2) "At present, there is no data that associates adverse human events with use of mobiles. There is ***little proof also of gadgetry that is sold to eliminate or attenuate the radiation as a 'shield' when applied to the handsets, or even the transmitting towers.*** The largest study, i.e. 'Interphone Study', has also not shown any difference in pathology between populations exposed and unexposed to cell phone radio-frequency."

http://youtube/obP32yxzjAE

Dr. Anoop Kohli
(Neurologist), New Delhi

3)"There is so much misrepresentation about incidence of brain tumors and use of cell phone. The incidence of brain tumors in India is unchanged over last 10 years. Hence, introduction of cellular phones and mobile services does not seem to have increased the risk of brain tumors and cancer."
http://youtube/96ONQ4GV6v4

Dr. Purvish M. Parikh
MD, DNB, FICP, PHD, ECMO, CPI,
MBA and currently Managing Director of AmeriCares

4) "Radiofrequency waves have been in the environment since times immemorial and the same waves used in wireless telecommunications have not been scientifically proven to cause any harmful effects to human health. We are subjected to greater risks every second, why single out wireless telecommunications. There are also no formal studies that show any adverse effect on growth and development in children. Thus the benefits of advanced telecommunications far outweigh the risks at present."

http://youtube/obP32yxzjAE

Dr. Manisha Mohan
MBBS (Seth GS Medical college and KEM Hospital), DCH, Sion Hospital, LTMMC, (Gold Medalist, Mumbai University), and DNB in Paediatrics from Lilavati Hospital, Bandra and a Consulting Pediatrician at Jupiter Hospital, Thane & Specialty Clinic, Bandra, Mumbai

5) "Various International case control study has found no increase in the risk of brain tumor with the use of mobile phone. There is no cause of panic and fear. While this technology has brought telecommunication revolution helping economic growth and well being of people, its misuse should be avoided."

http://youtube/xVqeH7N9yZg

Dr. A. K. Anand
(Radiotherapist & Oncologist), New Delhi

# Myths vs Facts

Attempts are being made to confuse the general public regarding different aspects of emission from BTS and mobile phones. This section addresses these myths, and places facts from a trusted body like the WHO in context of the myths.

**MYTH: The International limits are not safe as they do not take into account non thermal or biological effects**

**FACT:** World Health Organization has said

- *"The exposure limits for EMF fields developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) were developed following reviews of all the peer- reviewed scientific literature, including thermal and non-thermal effects. The standards are based on evaluations of biological effects that have been established to have health consequences."*
  **http://www.who.int/pehemf/standards/en/**

- *"With more and more research data available, it has become increasingly unlikely that exposure to electromagnetic fields constitutes a serious health hazard, nevertheless, some uncertainty remains."*
  **http://www.who.int/pehemf/about/WhatisEMF/en/index5.html**

- *"Strict adherence to existing national or international safety standards: such standards, based on current knowledge, are developed to protect everyone in the population with a large safety factor."*

  **http://www.who.int/peh-emf/about/WhatisEMF/en/index5.html**

**MYTH: WHO says cell phone use can increase cancer risk…International Agency for Research on Cancer has found evidence of increase in glioma and acoustic neuroma brain cancer for mobile users.**

**FACT:** The WHO Fact Sheet No. 193, June 2011 states *"The largest retrospective case-control study to date designed to determine whether there are links between use of mobile phones and head and neck cancers in adults, with analysis of data gathered from 13 participating countries, found no increased risk of glioma or meningioma with mobile phone use of more than 10 years. There are some indications of an increased risk of glioma for those who reported the highest 10% of cumulative hours of cell phone use, although there was no consistent trend of increasing risk with greater duration of use. The researchers concluded that biases and errors limit the strength of these conclusions and prevent a causal interpretation."*
**http://www.who.int/mediacentre/factsheets/fs193/en/index.htm**

**MYTH:** Using a cell phone will cause Tinnitus, irreversible hearing loss and lead to Ear Tumour.

**FACT:** The U.S. National Library of Medicine National Institutes of Health states *"Tinnitus is the medical term for "hearing" noises in your ears when there is no outside source of the sounds…Tinnitus can be a symptom of almost any ear problem, including Ear infections, Foreign objects or wax in the ear, Injury from loud noises, Meniere's disease…Alcohol, caffeine, antibiotics, aspirin, or other drugs can also cause ear noises. Tinnitus may occur with hearing loss. Occasionally, it is a sign of high blood pressure, an allergy, or anemia. Rarely, tinnitus is a sign of a serious problem like a tumor or aneurysm."*

**MYTH:** It is not safe to live near a mobile tower

**FACT:** The IARC Press Release, 31 May 2011 states that *"the evidence was evaluated as being limited among users of wireless telephones for glioma and acoustic neuroma, and inadequate to draw conclusions for other types of cancers. The evidence from the occupational and environmental exposures mentioned above was similarly judged inadequate."*
**http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf**

Environmental exposures as per IARC are exposures associated with transmission of signals for radio, television and wireless telecommunication.

**MYTH:** Increased cancer cases with proximity to towers

**FACT:** The WHO Fact sheet No. 304 dated May 2006 states that *"Media or anecdotal reports of cancer clusters around mobile phone base stations have heightened public concern. It should be noted that geographically, cancers are unevenly distributed among any population. Given the widespread presence of base stations in the environment, it is expected that possible cancer clusters will occur near base stations merely by chance."*
**http://www.who.int/mediacentre/factsheets/fs304/en/index.html**

**MYTH:** People living within 50 to 100 meter radius of a tower are in the high radiation zone are more prone to ill effects of electromagnetic radiation

**FACT:** The WHO Fact Sheet No.304 dated May 2006 states *"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.*

*The strength of RF fields is greatest at its source, and diminishes quickly with distance. Recent surveys have indicated that RF exposures from base stations and wireless technologies in publicly accessible areas (including schools and hospitals) are normally thousands of times below international standards.*

*In fact, due to their lower frequency, at similar RF exposure levels, the body absorbs up to five times more of the signal from FM radio and television than from base stations. … Further, radio and television broadcast stations have been in operation for the past 50 or more years without any adverse health consequence being established."*
**http://www.who.int/mediacentre/factsheets/fs304/en/index.html**

**MYTH:** A person should not use cellphone for more than 18-24 minutes a day; In USA, maximum SAR limit is 1.6w/kg which is for 6 minutes, it has a safety margin of 3-4.

**FACT:** The FCC website points out that

*"The averaging time for General Population/Uncontrolled exposure to fixed transmitters is not applicable for mobile and portable transmitters."*
**http://www.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65a.pdf**

**MYTH:** People living in the main beam are exposed to higher radiation levels complain of headaches, sleep disturbance, memory related disorders, fatigue, buzzing in the head, joint pain, miscarriage, cancer, etc.

**FACT:** The WHO Fact Sheet No.296, December 2005 states *"individuals have reported a variety of health problems that they relate to exposure to EMF…This reputed sensitivity to EMF has been generally termed "electromagnetic hypersensitivity" or EHS. EHS is characterized by a variety of non-specific symptoms, such as skin redness, tingling, and burning sensations; neurasthenic and vegetative symptoms (fatigue, tiredness, concentration difficulties, dizziness, nausea, heart palpitation, and digestive disturbances). The symptoms are certainly real and can vary widely in their severity. Whatever its cause ,there is no scientific basis to link EHS symptoms to EMF exposure. Further, EHS is not a medical diagnosis, nor is it clear that it represents a single medical problem."*
**http://www.who.int/mediacentre/factsheets/fs296/en/index.html**

**MYTH:** Effects such as sleep disruption, headache, concentration, forgetful memory, fatigue, dizziness, palpitations, visual disorders, cardio vascular problems, buzzing in the head, altered reflexes – many of these are related to changes in the electrical activity of the brain.

**FACT:** The WHO Fact Sheet No.193 dated June 2011 states *"At the frequencies used by mobile phones, most of the energy is absorbed by the skin and other superficial tissues, resulting in negligible temperature rise in the brain or any other organs of the body. A number of studies have investigated the effects of radio frequency fields on brain electrical activity, cognitive function, sleep, heart rate and blood pressure in volunteers. To date, research does not suggest any consistent evidence of adverse health effects from exposure to radio frequency fields at levels below those that cause tissue heating."*
**http://www.who.int/mediacentre/factsheets/fs193/en/index.html**

**MYTH:** Children are more vulnerable to EMF

**FACT:** The WHO Fact sheet No.193 dated June 2011 states *"with the recent popularity of mobile phone use among younger people, and therefore a potentially longer lifetime of exposure, WHO has promoted further research on this group."*

**http://www.who.int/mediacentre/factsheets/fs193/en/index.html**

Health Council of the Netherlands (2011) on Radio frequency electromagnetic fields and children's brains states that *"Available data do not indicate that exposure to radio frequency electromagnetic fields affect brain development or health in children."*

**http://www.gezondheidsraad.nl/en/news/infleuence-radiofrequency-telecommunication-signals-children-s-brains**

**MYTH:** EMF radiation is tantamount to being in a microwave!

**FACT:** All radiated energy from a phone/tower cannot be directed into a single point. Do you think if a person held a cup of water long enough then it would start to boil ?

**MYTH:** EMF limits needs to be reduced to 1/100 of existing levels to be safe.

**FACT:** For threshold effects, when a large margin of safety is assured, anything below is safe. Lower BTS emissions lead to Higher Emissions from the mobile phone. If the emission levels for BTS are lowered, it will result in a corresponding increase in the signal strength from the mobile phone, resulting in greater personal exposure of subscribers to EMF. *"An increased distance from the base station results in little or no reduction of the environmental level of electromagnetic fields and in a significant increase of power emitted by the phones."*

**MYTH:** A radiation shield will protect you from EMF exposure

**FACT:** The WHO Fact Sheet No.193 dated June 2011 states that *"The use of commercial devices for reducing radio frequency field exposure has not been shown to be effective."*
**http://www.who.int/mediacentre/factsheets/fs193/en/index.html**

**MYTH:** The GSM Association Health Booklet states

• Various products are being marketed that claim to increase the safety of mobile phone use. These products generally take the form of shielded cases, earpiece pads/shields, antenna clips/caps, special batteries and absorbing buttons.

• A mobile phone automatically operates on the lowest power necessary to maintain call quality. If an add-on device adversely affects the phone's antenna, the phone will attempt to transmit more power up to its specified maximum.

• Scientific evidence does not indicate any need for shields on mobile phones. They cannot be justified on health grounds and the effectiveness of many such devices in reducing exposure is unproven.

# Frequently Asked Questions

**Should I be concerned about the wireless network in my office or at my child's school?**

The UK Health Protection Agency advises that on the basis of current scientific information, Wi-Fi equipment satisfies international guidelines and therefore, there is no reason why schools and others should not use Wi-Fi equipment. The WHO concluded in May 2006 that *"...there is no convincing scientific evidence that weak RF signals from base stations and wireless networks cause adverse health effects."*

**Are the stories that mobile phones can cook eggs or make popcorn pop really myths?**

They are both myths. There is simply not enough power from a mobile phone to produce either effect. A mobile phone has a maximum average power of about 0.25 watts, compared to 900 watts or more from a microwave oven.

**Does a lower SAR mean that a phone is safer?**

No. Variations in SAR do not mean that there are variations in safety. While there may be differences in SAR levels among phone models, all mobile phones must meet RF exposure guidelines

**Why are there so many restrictions on using mobile phones in hospitals?**

At short range, the radio signal from a mobile phone may cause interference with electronic medical devices. At distances greater than 1-2m, the possibility is substantially reduced. It is possible for mobile phones to be used in designated areas of hospitals.

**Why can't I use my mobile phone when I fly?**

It is standard practice on aircraft to turn off all types of radio transmitters and certain other electrical devices unless they have been demonstrated not to cause interference to aircraft systems.

**How do we know that 3G and the other new radio technologies are safe?**

There is a large body of existing scientific research at frequencies above and below those for 3G services, and a growing body of science using these particular signals. Expert groups have not established any signal specific effects, so the scientific consensus is that compliance with current safety standards provides protection against all known health effects.

**Are some people more sensitive to radio signals?**

The WHO concluded in Fact Sheet No. 296 of December 2005 that while self-reported headaches and other symptoms were real, there was no scientific basis to link the symptoms to exposure to radio signals. Furthermore, the WHO says that treatment should focus on medical management of the health symptoms and not on reducing exposure to radio signals.

**I've read stories claiming that mobile phones can affect male fertility and sperm quality, is this true?**

Some preliminary scientific studies have reported a link, however, these studies have generally not properly accounted for lifestyle factors, for example, diet, smoking, etc. The consensus view of expert public health bodies, including the WHO, is that there are no adverse health effects associated with the radio signals used by mobile phones or base stations.

**Where can I get the SAR value for my phone?**

SAR information for many phones is now included with the instructions as well as being published on the company website.

**BioInitiative Report (BIR) recommends 1000μw/m2 for outdoor cumulative exposure and 100μw/m2 for indoor cumulative exposure**

The IEEE Committee on Man and Radiation (COMAR) published a critique of the BIR in the Technical Information Statement (TIS) published in 2009 stating *"Since appearing on the Internet in August 2007, the BIR [BioInitiative Report] has received much media attention but, more recently, has been criticized by several health organizations (see Section titled "Views of health agencies about BIR"). COMAR concludes that the weight of scientific evidence in the RF bioeffects literature does not support the safety limits recommended by the BioInitiative group. For this reason, COMAR recommends that public health officials continue to base their policies on RF safety limits recommended by established and sanctioned international organizations such as the Institute of Electrical and Electronics Engineers International Committee on Electromagnetic Safety and the International Commission on Non-Ionizing Radiation Protection, which is formally related to the World Health Organization."*

**How is compliance to the Government regulations measured and monitored? Who does this on the ground?**

Indian Service Providers undergo regular stringent measurements and audits (by TERM cells which is the enforcement arm of the DoT) and provide certificates regarding compliance with these standards for each Base Station antennae. There is a penalty for any non-compliance to this license condition.

All telecom operators, in accordance with their licence conditions are required to be in compliance with the safety standards and guidelines for EMF as laid down by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

**How is the actual level of radiation in the field tested?**

In Sep 2009, Telecommunications Engineering Centre (TEC) specified the Test Procedure for Measurement of Electromagnetic Fields from Base Station Antennas. In case a citizen has a concern regarding the measurements or EMF exposure level at any BTS site, then the local TERM Cell may be contacted for getting the measurements of EMF exposure in their vicinity.

The Contact details of the TERM Cell officers are available at http://dot.gov.in/vtm/Contact%20details_TERM_new.xls.

This booklet has been issued in public interest by **Cellular Operators Association of India (COAI)** and **Association of Unified Telecom Service Providers of India (AUSPI).** If you have any further queries, please visit www.coai.com or www.auspi.in