

Frequently Asked Questions & Answers

General

1. What is IARC?

IARC coordinates and conducts research on the causes of human cancer, the mechanisms of carcinogenesis, and to develop scientific strategies for cancer prevention and control.

The IARC Monographs (of which this is one) identify environmental factors that may be carcinogenic to humans. National health agencies may use this information as support for their actions to prevent exposure to potential carcinogens.

2. Can you briefly outline the IARC process?

The IARC working group process evaluates the strength of evidence from human and animal data that an agent may cause cancer in humans. The classification refers to the strength of the evidence and not to the carcinogenic potential (danger) of the agent.

The IARC evaluation assesses whether an agent is a *cancer hazard*, that is, whether it is capable of causing cancer under some circumstances. It is the first step in assessing *cancer risk*, which estimates the carcinogenic effects relative to the level of exposure.

An agent may be classed as a *cancer hazard* by IARC even though the *cancer risk* is low at current human exposures.

3. What classification has IARC given to RF electromagnetic fields and what does the IARC classification for RF mean?

The IARC working group meeting of May 2011 classified exposure to radio frequency as:

- *2B: possibly carcinogenic to humans* –

This is the third of the 5 classifications and means that the working group concluded that combined strength of the evidence from human and animal studies showed a possible cancer hazard to humans. Governments and public agencies will conduct a risk assessment to determine if there is a risk to the public at current levels of exposure to radio signals.

IARC states: 'This category is used for agents for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence of carcinogenicity in experimental animals. It may also be used when there is inadequate evidence of carcinogenicity in humans but there is sufficient evidence of carcinogenicity in experimental animals.'

- *3: not classifiable as to its carcinogenicity to humans*

This is the fourth of the 5 classifications and means that the working group concluded that combined strength of the evidence from human and animal studies was inadequate to show cancer hazard to humans. Governments and public agencies will

conduct a risk assessment to determine if there is a risk to the public at current levels of exposure to radio signals.

IARC states: 'This category is used most commonly for agents for which the evidence of carcinogenicity is inadequate in humans and inadequate or limited in experimental animals....'

Agents that do not fall into any other group are also placed in this category.

- *4: probably not carcinogenic to humans*

This is the fifth of the 5 classifications and means that the working group concluded that combined strength of the evidence from human and animal studies showed a lack of cancer hazard to humans.

IARC states: 'This category is used for agents for which there is evidence suggesting lack of carcinogenicity in humans and in experimental animals. In some instances, agents for which there is inadequate evidence of carcinogenicity in humans but evidence suggesting lack of carcinogenicity in experimental animals, consistently and strongly supported by a broad range of mechanistic and other relevant data, may be classified in this group.'

The Monograph (full report) will be published in the future with details of the assessment of the scientific evidence leading to this classification.

4. What does this mean for the industry?

The IARC monograph 102 will now be considered by health authorities, such as the WHO, in order to evaluate if there are any overall impact on our health and what needs to be done in order to address them.

It is important to note that IARC have only assessed the possible potential for RF electromagnetic fields to cause harm (hazard) in some circumstances and not the likelihood that in normal use they do cause harm (risk).

5. What does this mean for the public?

Mobile phones and their base stations are designed to operate within international and national exposure limits which already have substantial safety margins built into them, therefore the existing advice from WHO and other health agencies remains valid.

However, this assessment may concern some people. If people are concerned they can easily reduce their exposure to mobile phone radio signals.

For example the WHO provides the following information on how to effectively reduce mobile phone exposure:

"The power (and hence the radiofrequency exposure to a user) falls off rapidly with increasing distance from the handset. 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. The use of commercial devices for reducing radiofrequency field exposure has not been shown to be effective."

6. Does this mean people who live near base stations could 'possibly' get cancer?

The exposure levels from base stations are typically thousands of times lower than the WHO recommendations for public exposures.

In relation to base stations and health, the WHO fact sheet on *Electromagnetic fields and public health*¹ has concluded that:

Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.

7. Doesn't the IARC classification confirm that mobile phone base stations/masts are dangerous?

IARC has only assessed the potential for RF electromagnetic fields to cause harm (hazard) in some circumstances and not the likelihood that in normal use they do cause harm (risk). WHO and other health authorities will determine its overall impact.

Wireless devices including mobile phones and their networks are designed to operate within international and national exposure limits which already have substantial safety margins built into them. The exposure levels from base stations are typically thousands of times lower than the WHO recommendations for public exposures.

In relation to base stations and health, the WHO fact sheet on *Electromagnetic fields and public health*² has concluded that:

Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.

8. What about cancer clusters around base stations?

The WHO specifically addresses the issue of cancer clusters around base stations in the Fact Sheet No. 304³ and said:

Media or anecdotal reports of cancer clusters around mobile phone base stations have heightened public concern. It should be noted that geographically, cancers

¹ WHO Fact sheet 304 (May 2006) *Electromagnetic fields and public health*
<http://www.who.int/mediacentre/factsheets/fs304/en/index.html>

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.

Moreover, the reported cancers in these clusters are often a collection of different types of cancer with no common characteristics and hence unlikely to have a common cause. Scientific evidence on the distribution of cancer in the population can be obtained through carefully planned and executed epidemiological [population] studies.

Over the past 15 years, studies examining a potential relationship between RF transmitters and cancer have been published. These studies have not provided evidence that RF exposure from the transmitters increases the risk of cancer. Likewise, long-term animal studies have not established an increased risk of cancer from exposure to RF fields, even at levels that are much higher than produced by base stations and wireless networks.”

9. Doesn't this assessment confirm that mobile phone base stations are dangerous? More dangerous than mobile phones – because we're exposed 24/7 from base stations.

IARC has only assessed the potential for RF electromagnetic fields to cause harm (hazard) in some circumstances and not the likelihood that in normal use they do cause harm (risk). WHO and other health authorities will determine its overall impact and what more, if anything, needs to be done.

Wireless devices including mobile phones and their networks are designed to operate within international and national exposure limits which already have substantial safety margins built into them. The exposure levels from base stations are typically thousands of times lower than the WHO recommendations for public exposures.

In relation to base stations and health, the WHO fact sheet on Electromagnetic fields and public health has concluded that:

“Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.”

10. Does this mean that mobile phones are dangerous?

The IARC monograph will now be considered by health authorities, such as the WHO, in order to evaluate if there are any overall impacts on our health from mobile phones and their base stations and what needs to be done in order to address them.

If people are concerned about using their phone then they can easily reduce their exposure to mobile phone radio signals. For example the WHO⁴ provides the following information on how to effectively reduce mobile phone exposure:

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. The use of commercial devices for reducing radiofrequency field exposure has not been shown to be effective.'

11. Has IARC concluded that mobile phones cause cancer?

IARC have only assessed the potential for RF electromagnetic fields to cause harm in some circumstances and not the likelihood that in normal use they do cause harm.

The IARC assessment will now be considered by health authorities, such as the WHO, in order to evaluate if there are any overall impacts on our health from mobile phones and their base stations and what needs to be done in order to address them.

12. Doesn't the evidence now suggest a clear link between mobile phone use and brain tumours?

No, there is no clear link between mobile phone use and brain tumors. Based on the limited evidence, the IARC can only classify RF electromagnetic fields as a possible carcinogen (2B).

The consensus of expert groups worldwide is that there is no established health risk from mobile phone radio signals. The WHO5 stated in May 2010:

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 for mobile phone use.

Recent studies in the UK⁶ and the USA⁷ have found no evidence of increases in brain cancer rates since the widespread use of mobile phones.

Furthermore, studies of mobile phone users have found no overall evidence of increased cancer risk for up to 10 years of use.

There is limited availability of longer-term human data, however, long term animal studies are showing no overall evidence of increased cancer risk and in vitro studies have found no consistent evidence of a mechanism by which radio signals could increase cancer risk.

13. Surely the industry can no longer continue to deny a link between mobile phone use and brain cancer?

The industry relies on expert organizations, such as the WHO, that have evaluated the relevant scientific data and concluded that no adverse health effects have been established for mobile phone use.

We have now been using mobile phones for nearly 30 years and they have been in widespread use for two decades without any significant increase in the rates of brain tumour being found.

Worldwide

For example, in regard to brain cancer incident rates the most recent World Cancer Report said:

“After 1983 and more recently during the period of increasing prevalence of mobile phone users, the incidence has remained relatively stable for both men and women.”

United States

A study of more than 38,000 brain cancer cases from 1977 to 2006, published in July 2010 by the US National Cancer Institute, found:

“Overall, these incidence data from the United States based on high-quality cancer registries do not provide support for the view that use of cellular phones causes brain cancer.”

Europe

This result is consistent with a 30-year analysis of cancer cases reported amongst 16 million adults in Europe published in 2009:

“From 1974 to 2003, brain tumour incidence rates in Denmark, Finland, Norway, and Sweden were stable, decreased, or continued a gradual increase that started before the introduction of mobile phones.”

They also found no change from 1998 to 2003 – the years in which mobile phone use grew rapidly.

England

A recent analysis by scientists from Manchester University has also shown there has been no noticeable change in the incidence of brain cancer in England:

“The increased use of mobile phones between 1985 and 2003 has not led to a noticeable change in the incidence of brain cancer in England between 1998 and 2007.”

“Given the widespread use and nearly two decades elapsing since mobile phones were introduced, an association should have produced a noticeable increase in the incidence of brain cancer by now.”

Also, the possibility of longer-term risks is being addressed in the COSMOS study that plans to follow the health of 250,000 European mobile users for 20-30 years.

The mobile communications industry supports well-conducted and independent research, which will help to clarify any uncertainty identified by the IARC evaluation.

14. Does this mean more research is needed?

The IARC monograph will now be considered by health authorities, such as the WHO, in order to evaluate if there are any overall impacts on our health from mobile phones and their base stations and what needs to be done in order to address them.

This may include the need for further research.

The mobile communications industry supports well-conducted and independent research which will help to clarify any uncertainty identified by the IARC evaluation.

15. Are more people being diagnosed with brain cancer as mobile phones become more popular?

We have now been using mobile phones for nearly 30 years and they have been in widespread use for two decades without any significant increase in the rates of brain tumour being found.

If there was a link with cancer we would expect to see some indication by now.

Worldwide

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Also, the possibility of longer-term risks is being addressed in the COSMOS study that plans to follow the health of 250,000 European mobile users for 20-30 years.

16. Does the classification mean that the ICNIRP guidelines need to be amended?

This is a matter for ICNIRP.

The ICNIRP guidelines are set by an independent committee of international experts who carefully review all relevant scientific literature and who keep the guidelines under regular review.

ICNIRP reviewed all available evidence, including the published national studies for Interphone, in 2009. The Committee stated, in September 2009, that public exposure guidelines for mobile phones and base stations are protective for all persons. The Committee reiterated its position after the publication of the Interphone overall analysis of glioma and meningioma in May 2010.

17. Don't we now need new health and safety guidelines as a matter of extreme urgency?

Questions about the validity of the safety standard should be put to the independent international standard setting bodies.

The independent international standard setting bodies are constantly reviewing the overall scientific evidence available to them.

Only last year (2010) the International Commission on Non-Ionizing Radiation Protection (ICNIRP) reconfirmed their guidelines.

The guidelines have been developed using worst-case scenarios and include added safety margins to ensure everyone in the community including the elderly, children or pregnant women are protected.

For example, the WHO supports the standards evaluation process, which includes independent experts from many nations and does not include any members from industry saying:

The exposure limits for EMF fields developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) - a non-governmental organization formally recognised by WHO, 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. The main conclusion from the WHO reviews is that EMF exposures below the limits recommended in the ICNIRP international guidelines do not appear to have any known consequence on health.

The ICNIRP guidelines are set by an independent committee of international experts who carefully review all relevant scientific literature and who keep the guidelines under regular review.

ICNIRP reviewed all available evidence, including the published national studies for Interphone, last year. The Committee stated, in September 2009, that public exposure guidelines for mobile phones and base stations are protective for all persons. The Committee reiterated its position after the publication of the Interphone overall analysis of glioma and meningioma in May 2010.

18. Do you think that scientists and health agencies will now warn mobile phone users to modify their phone use?

The IARC monograph will now be considered by health authorities, such as the WHO, in order to evaluate if there are any overall impacts on our health from mobile phones and their base stations and what needs to be done in order to address them.

The IARC classification does not mean that additional precautionary measures are required but some health authorities may advise people to take their own precautions if they are concerned.

If people are concerned, they can easily reduce their exposure to mobile phone radio signals.

For example the WHO provides the following information on how to effectively reduce mobile phone exposure:

“The power (and hence the radiofrequency exposure to a user) falls off rapidly with increasing distance from the handset. 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. The use of commercial devices for reducing radiofrequency field exposure has not been shown to be effective.”

19. Why do we need to wait for more research before taking action now to protect peoples' health?

Research on possible biological effects from RF exposure has been more than 60 years. In the past decade, more than 30 authoritative, independent expert scientific reviews undertaken around the world, including by the World Health Organisation, have not found adverse health effects caused by mobile phone telephony operating within the ICNIRP public exposure guidelines.

20. Aren't mobile phones just like cigarettes and asbestos – we won't be told the truth until it's too late?

It's understandable that people might have similar concerns about mobile phones because of their experience with other health controversies, like tobacco and asbestos.

Therefore, we do not expect everyone to accept our assurances about mobile phone safety.

We rely on the advice of independent international health authorities around the world, who continue to review the scientific evidence available to them, which will include the IARC assessment.

21. Is the industry now going to advise its customers to modify their phone use? If not, why not?

The most important thing is that if people are concerned they can easily reduce their exposure to mobile phone radio signals.

For example the WHO provides the following information on how to effectively reduce mobile phone exposure:

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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. The use of commercial devices for reducing radiofrequency field exposure has not been shown to be effective.”

22. Previously IARC classified the magnetic fields from power lines as a possible human carcinogen, in particular for childhood leukaemia. Doesn't the latest IARC classification reinforce that EMFs are dangerous to people?

The extremely low frequency electric and magnetic fields from powerlines are very different from radio signals. These are two quite separate parts of the electromagnetic spectrum, and have different effects when applied at high intensities (electrostimulation vs. heating), so it would be like comparing apples and oranges.

23. Should mobile phone users use mobile phone shields to reduce their risk?

Mobile phones are designed to comply with scientifically based exposure standards that provide protection against all established health risks. The US Food and Drug Administration (FDA) and the WHO have warned that shield devices cannot be justified on health grounds and their effectiveness is unproven.

Some of these devices interfere with the operation of the phone and may actually increase exposure. Consumer protection agencies in Australia, the UK and the US have successfully challenged the claims made by promoters of some products.

24. What does the industry say in response to possible long-term risks?

First, the results of epidemiological studies of mobile phone users are reassuring and show no overall increase in risk from mobile phone use.

Secondly, there are more than 30 animal studies with durations from 6 months up to about 2 years life time exposure that overall show no effect on cancer. These are similar to the studies relied on by regulatory agencies to assess the safety of medicines and other products.

Thirdly, there is no established mechanism by which radio signals could increase cancer risk. For example, they are too weak to directly affect genetic material.

Many expert groups have concluded that there are no established health risks from exposure to radio signals below the levels recommended by the WHO.

25. What is the level of exposures from mobile phones used against the head or at arm's length?

Mobile phones adjust their powers to operate at the lowest level needed for communication. This reduces interference to other callers and increases the battery life of the phone.

For example, 3G handsets typically transmit at is less than 1% of their maximum, which is less than a home cordless phone.

When a phone is used at arm's length the exposure to the head is about 100 times lower than when against the ear.

26. Is this assessment is particularly worrying for parents whose children will potentially use mobiles for a long period – perhaps up to 40 or 50 years or more?

It is entirely understandable that parents are concerned about their children's use of mobile phones because young people will use mobile phones for most of their lives. A study – called MOBIkids – is now underway to assess any potential brain cancer risks associated with the use of mobile phones by children and teenagers.

The five-year study will involve young people aged 10 to 24 who have had a brain cancer as well as people of a similar age who have not and will recruit participants from Australia, New Zealand, Spain, The Netherlands, France, Germany, Austria, Italy, Greece, Israel and Canada.

Although it needs to be remembered that one of the complexities of a study like this is that young people use phones differently than adults, preferring to send text messages or chat on line rather than make voice calls which means they rarely hold the phone next to their heads.

Also, international exposure standards have taken these concerns and potential risks into account when setting safe exposure limits. The guidelines have been developed using worst-case scenarios and include added safety margins to ensure children are protected.

For example, the Chairman of the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which developed the international safety standard, has concluded:

The protection system using basic restrictions and reference levels makes the ICNIRP guidelines flexible and applicable to virtually any exposure condition, and any group of population. Therefore, there is no need, or justification, for a special approach to the protection of children.⁸

However, a number of independent reviews of all the available science by international health authorities and governments have carefully considered this concern and have not found that there are any established adverse health effects to children from the use of mobile phone technologies.

27. Does the brain of a child absorb a much greater amount of radiation from a cell phone compared to the brain of an adult?

A large amount of research has considered whether or not a child's head absorbs more RF energy than adults.

The overall conclusion of the health authorities who have reviewed all this research is the range of absorption in children's heads is within the variation of the adult population.

For example, in 2009 the Mensch Umwelt Technik (MUT) of the Julich Research Institute, Germany specifically considered this concern in a review.

The report was based on the scientific opinions of seven internationally recognized experts and four advisory experts from Australia, Austria, Belgium, Germany, Italy and Switzerland as well as on a series of workshop discussions. The report concluded:

...there is no conclusive evidence that SAR levels from mobile phones are higher in the heads of children than adults.

Advice published in 2004 by the Health Council of the Netherlands which also considers all the research on mobile phones and children concluded:

There is no scientific data to assume a difference in the absorption levels of electromagnetic energy in heads of children and adults, nor is it likely that the electromagnetic sensitivity of children's heads changes significantly after the second year of life. Because of this, the Health Council of the Netherlands sees no reason for recommending limiting the use of mobile phones by children.

28. Are children more vulnerable to mobile radiation because of their thinner skulls and still developing brains?

The view that children absorb more energy than adults from mobile phones was proposed in a paper in 1996 and the computer modelling images are widely distributed on the internet in support of this incorrect claim.

Much more recent studies that use Magnetic Resonance Imaging (MRI) data from actual adult and children's heads do not support this claim. The more recent studies have been reviewed by a number of independent health authorities who have found no evidence of an additional risk to children.

A recent study, which conducted an in-depth scientific review of all the science on mobile phone use by children, published in 2007 by the Irish Government Expert Group found:

expert analysis has concluded that there are no major effects due to focusing of the RF field in the head or to other properties of a child's head that might result in higher absorption of RF energy (Christ and Kuster, 2005; Keshvari and Lang, 2005).

Advice published in 2004 by the Health Council of the Netherlands which also considers all the research on mobile phones and children concluded:

There is no scientific data to assume a difference in the absorption levels of electromagnetic energy in heads of children and adults, nor is it likely that the electromagnetic sensitivity of children's heads changes significantly after the second year of life. Because of this, the Health Council of the Netherlands sees no reason for recommending limiting the use of mobile phones by children.

Do the safety standards originally designed for adults to use phones, also protect children? Austrian study, published in January 2008 investigated previous health risk assessments and established physiological knowledge regarding mobile phone use, particularly with reference to children's health. The report stated:

Based on the assessments of the international committee and established knowledge on children's development it can be concluded that existing exposure limits do in fact provide reasonable safety.

Furthermore, the report concluded:

There are no sufficient grounds to generally condemn mobile phone use by children, in particular, nor is there an established basis for pinpointing a specific age limit (above 3 years) as has been done by some overreacting committees.

The Chairman of the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which developed the safety standard that protects all users including children, has concluded:

The protection system using basic restrictions and reference levels makes the ICNIRP guidelines flexible and applicable to virtually any exposure condition, and any group of population. Therefore, there is no need, or justification, for a special approach to the protection of children.