



# CELL PHONE SAFETY FACTSHEET

## INTRODUCTION

There has been concern about the safety of cell phone use for as long as these phones have been available. The following information summarizes what is and isn't known at the present time concerning whether these phones can pose a radiation health hazard and what can be done to minimize any potential risks.

## BACKGROUND

Cell phones, which are now used by close to 200 million Americans, emit relatively low levels of radiofrequency (RF) radiation that is somewhat similar to the radiation generated inside microwave ovens and by radars, but at a *very much lower intensity*. These phones emit RF radiation at all times, but the emitted power is much higher when the phones are actually being used than when they are in the "stand-by" mode.

## HEALTH ISSUES

It is known that high levels of RF radiation can produce biological damage primarily due to tissue heating effects. But it is not known whether, to what extent, and through what mechanism (if any), low levels of RF radiation might cause biological effects. Although research has been performed to answer these questions, no clear picture of the biological effects of this type of radiation has emerged to date through peer-reviewed, reproducible, scientific studies. Therefore, our current knowledge does not permit us to state definitively that mobile phones are absolutely safe, or that they are unsafe. *But available scientific evidence does not demonstrate any significant adverse health effects (no increased risk of brain cancer, etc.) associated with the normal use of cell phones.*

Information on health effects studies related to cell phone radiation can be found at the websites below, which also include some information on RF radiation health standards and cell phone base stations (sometimes referred to as "cell sites"):

<http://www.fda.gov/cellphones/>

[http://en.wikipedia.org/wiki/Mobile\\_phone\\_radiation\\_and\\_health](http://en.wikipedia.org/wiki/Mobile_phone_radiation_and_health)

## RF RADIATION EMISSION LEVELS

The parameter used to measure the radiation emitted by cell phones is the **specific absorption rate (SAR)** given in units of Watts of power absorbed per kilogram of tissue (W/kg). The permissible upper limit for cell phones set by the U.S. Federal Communications Commission (FCC) is 1.6 W/kg of RF radiation.

*The SAR value for your phone or for phones you are thinking of purchasing can be found at this website:*

[http://reviews.cnet.com/4520-6602\\_7-5020355-1.html](http://reviews.cnet.com/4520-6602_7-5020355-1.html)



The SAR determined by testing your phone will be a number between 0 and 1.6 W/kg. As mentioned above, the SAR is a measure of the RF radiation that your brain absorbs. Knowing that the FCC limit is 1.6 W/kg and that some low-radiation phones have SARs lower than 0.3 W/kg, you will be able to tell where your phone stands regarding RF radiation emission.

## REDUCING RF RADIATION EXPOSURE

If there is an RF radiation risk from cell phones, it is probably small. But if you are interested in minimizing your potential risk, here are some simple steps that you can take:



- Purchase a cell phone with a low SAR rating.
- Reduce the amount of time that you spend on the cell phone by using a conventional corded phone whenever possible. Use of a corded phone (also called a “land line”) does not involve RF radiation exposure at all and is the preferred option if you need to be on the phone a lot. Corded phones should be used for normal day-to-day communication needs in homes and offices, especially for very lengthy calls and very frequent calls, just as a precaution.
- Turn off your cell phone when it is not needed.
- You can use the **speaker phone** setting on a cell phone to greatly reduce the RF radiation exposure because the phone’s antenna will not be directly next to your head (and brain). *Using text messaging is also a good way to reduce RF exposure to your head.* The farther the phone is away from you, the lower your exposure. Hands are very insensitive to cell phone radiation.
- Cell phone radiation drops off very quickly as you move away from the phone’s antenna. As an approximation, if you double the distance between your head and the cell phone antenna the radiation exposure is reduced to 1/4 of what it was initially.
- Be aware that cell phones emit RF radiation to some degree even when in the “standby” mode - when they are on but not in use. However, the radiation emitted in the "standby" mode is much lower than that emitted when the phone is in use. The phone is always in contact with a nearby cell site/base station when it is on, thus some radiation is always emitted. You can avoid this radiation by either keeping the phone off and letting calls go to voicemail, or having it away from your body like in a purse or backpack. Keeping a cell phone on in your pants pocket all day is not recommended.



## WIRELESS HANDS-FREE DEVICES

Hands-free kits can be used with cell phones for convenience, comfort, and improved safety. These systems reduce the absorption of RF radiation in the head because the phone’s antenna, which is the source of the radiation, is not near the head. On the other hand, if the phone is mounted on a belt or other part of the body during use, then that part of the body will absorb more RF radiation. However, cell phones marketed in the

U.S. are required to meet safety requirements regardless of whether they are used against the head or against other parts of the body. All possible configurations should result in compliance with the safety limit.

### **Bluetooth Headsets**

Bluetooth is the name of a wireless technology standard for connecting data or voice devices thus replacing cords, wires, and cables. It uses RF radiation to transmit information over short distances of generally 10 meters or less. By embedding a Bluetooth chip and receiver into products, wires that would normally carry the data or voice signal can be eliminated. In the case of cell phone headsets, the voice signal is transmitted by RF radiation from the Bluetooth device in the cell phone to a receiver/headset.



**Bluetooth headset antennas emit at much lower power levels than the cell phones themselves so the RF radiation added by a Bluetooth headset is insignificant by comparison.** For example, a typical Ericsson Bluetooth headset generates an SAR of just 0.001 W/kg, far below that emitted by the cell phone antenna (as mentioned previously, it can be as high as 1.6 W/kg).

Thus, if you are concerned about the health effects of RF radiation, keep in mind that the cell phone is a much greater source of radiation than a Bluetooth headset.

More information on Bluetooth headsets can be found at these websites:

<http://telecom.hellodirect.com/docs/Tutorials/HeadsetBenefits.1.110200.asp>  
[http://www.businessweek.com/technology/content/apr2005/tc20050427\\_5651.htm](http://www.businessweek.com/technology/content/apr2005/tc20050427_5651.htm)



### **Corded Earbuds**



Corded earbud devices also reduce the RF radiation exposure to the head since the cell phone is not adjacent to the head during use. The voice signal is sent electronically to the earbud directly from the phone in a similar manner to when an earbud device is plugged into a radio. Of course, it is not advisable to place the cell phone on your lap when earbuds are used – the farther away from you the cell phone itself is, the lower will be your radiation exposure.

### **Air Tube Systems**

The air tube hands-free headset keeps RF radiation away from the head by using a hollow “air tube” to transmit sound from the cell phone speaker through a tube containing air to an earpiece. The tube and earpiece contain no metal conductors, hence virtually eliminating any radiation otherwise present in conventional hands-free devices. The voice information is transmitted by sound waves in a plastic tube, not via RF radiation. The sound quality might not be as clear as with other hands-free options, so it would be best to test one before purchasing it or get a recommendation from an acquaintance who has one.



## CELL PHONE SHIELDS

Since cell phones are so prevalent, it is not surprising that promoters have marketed RF “shields” as protection against the RF radiation the phones emit. But the U.S. Federal Trade Commission (FTC), the nation’s consumer protection agency, says that manufacturer claims regarding these “shields” are mostly baseless.



**According to the FTC, there is no scientific proof that the so-called “shields” significantly reduce RF radiation exposure from cell phones.** In fact, says the agency, products which block only the earpiece or another small portion of the cell phone are totally ineffective because the entire phone emits radiation. What’s more, these shields can interfere with the phone’s voice signal, causing it to draw even more power to communicate effectively with the base station, and possibly emitting even more radiation.

The FTC works for the consumer to prevent fraudulent and deceptive business practices in the marketplace and to provide information to help consumers spot, stop, and avoid scams. If you believe that you have been cheated by purchasing a cell phone “shield”, you can file a complaint or obtain free information on consumer issues by visiting [www.ftc.gov](http://www.ftc.gov) or calling toll-free 1-877-FTC-HELP (1-877-382-4357).

More information concerning cell phone shields can be found at this website below:

<http://www.cbsnews.com/stories/2002/02/20/tech/main330039.shtml>



## PHYSICAL HAZARDS FROM CELL PHONE USE

Although the radiation risk from the use of cell phones is considered to be small, there are other substantially more serious hazards related to use of these phones. Many people use them while they are performing tasks that demand the user’s complete attention. Following some general rules will help in reducing these hazards:

- Avoid using a cell phone while driving or while operating dangerous equipment (power tools, lawn mowers, etc.).
- If you need to use a cell phone while driving, make sure that it is a hands-free system, especially in states and municipalities in which the use of a hand-held cell phone while driving is prohibited by law (this includes **California**).
- **Keep in mind that the danger related to cell phone conversations while driving is not solely due to only having one hand on the steering wheel. Rather, conducting a phone conversation causes driver inattention/distraction which in turn can lead to accidents.** Drivers appear to be particularly prone to distraction during lengthy or emotionally-charged phone conversations.
- Never read or write text messages in a moving vehicle! Also, do not inscribe information on paper that is conveyed to you over your hands-free phone (phone numbers, addresses, etc.) while driving. Don’t take notes or look up phone numbers in phone books.

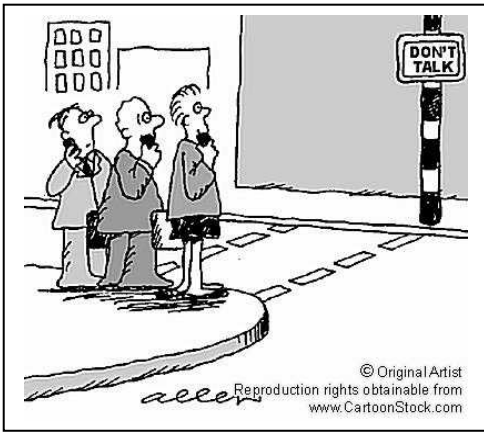
☞ If it is absolutely necessary to use a cell phone while driving a vehicle, adhering to some simple rules will greatly reduce the likelihood of accidents. Make sure that you:

- Are prepared for possible calls by having your hands-free device in a readily available location. It can be dangerous to have to search through a purse or bag for a phone while in a moving vehicle.
- Don't try to figure out how to use special features of a phone until it is safe (do that ahead of time).
- Don't use the phone at all while driving in bad weather conditions (rain, fog, snow, etc.).
- Dial phone numbers only while at stop lights or stop signs, or pull over to the side of the road to talk.
- Keep phone calls as brief as possible.
- Practice using the phone prior to using it while driving.
- Your cell phone screen is probably too small for you to quickly see who is calling, so don't check for caller ID info while driving; it's just too distracting. Let incoming calls go to voice mail and retrieve the messages later when it is safe.
- Be careful when pulling over to the side of the road to place phone calls. To avoid being a crime victim, do not stop in dangerous areas and keep your car doors locked and windows closed. Make sure 911 is programmed into your phone.
- Don't stop on the highway to make or answer a cell phone call. It can be dangerous to pull over onto a highway shoulder and then merge back into fast-moving traffic. If you need to make a call while you're on the highway, get off at the nearest exit to make the call.
- Print driving directions in large lettering before you leave. If you get lost driving to an appointment, it's tempting to simply call the person you'll be meeting and ask for assistance. Printing out directions to refer to only when you're parked (or in Los Angeles traffic - there's no difference; you are stopped either way) helps you avoid that temptation.
- Concentrate on the road! Don't get carried away talking on the phone. Keep both hands on the wheel and both eyes on the road.



The U. S. Federal Communications Commission (FCC) has published a list of frequently-asked questions and answers regarding cell phone safety. It can be accessed at the website below:

<http://www.fda.gov/cellphones/qa.html>



**Note:** It is not only during driving that people can experience safety problems when distracted by a cell phone conversation. People have been reported to have walked into traffic, fallen into ditches, and walked against red lights while on the phone. *Try to limit conversations to times when you can devote your full concentration to the call.*

## CONCLUSION

Cell phones are considered to be safe for normal use, but more studies are currently underway concerning possible long-term health effects due to repeated exposures to RF radiation over decades of use. To improve safety, use a hands-free device or the speaker phone option as a precaution.

## CELL PHONE ETIQUETTE

*Always be respectful of others when you use a cell phone.* Sharing space with someone talking loudly on a cell phone can be a real nuisance. Be sure to turn your phone off or put it on vibrate-only mode when in libraries, churches, movie theaters, restaurants, etc. Be cognizant of signs indicating that cell phone use is prohibited, like in most hospitals and medical buildings. Remember that politeness can be contagious!



*If you have additional questions or concerns regarding cell phone safety, contact Rick Mannix of EH&S at 949-824-6098 or by email at [rcmannix@uci.edu](mailto:rcmannix@uci.edu)*

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