

ISSUE BRIEF



Can Cell Phones Harm Our Health?

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The director of the University of Pittsburgh Cancer Institute, Dr. Ronald Herberman, warned his staff in July 2008 that the risks from cell phone radiation may be higher than we had thought. He advised that rather than wait for definitive studies, we should curb our cell phone use now.¹

The extensive use of cell phones is a relatively recent phenomenon, and since cancers usually take at least 10-20 years to develop, it will be years before research is likely to conclude whether cell phones cause cancer or not. However, the evidence indicates cause for concern. Meanwhile, there is new research showing that cell phone radiation (known as Radio Frequency-Electromagnetic Radiation or RF-EMR) harms sperm and may result in reduced fertility.² The lead researcher on the study, Dr. John Aitken from the University of Newcastle in Australia, recommends that men of reproductive age who would like to have children should avoid carrying cell phones in their pockets or anywhere below the waist. This is a dramatic development

because the level of radiation for a phone that is in a pocket while not being used is much lower than the level of radiation during a phone conversation.

What Does Research Tell Us about Cell Phones and Tumors?

A review of 18 studies of cell phones and brain tumors, published in *Occupational and Environmental Medicine* in 2007 by Lennart Hardell and his colleagues, concluded that studies of individuals using cell phones for more than 10 years "give a consistent pattern of an increased risk for acoustic neuroma and glioma" with the risk being highest for a tumor on the same side of the head that the phone is used.³ Gliomas are the most common cancerous brain tumor and acoustic neuromas are benign tumors of the acoustic nerve that can cause deafness. The studies were conducted in the United States, Sweden, Finland, the U.K., Germany, and Japan.

So why are companies insisting that the evidence shows that their cell phones are safe? Cell phone companies tend to focus on the studies they funded themselves and that draw conclusions

that will keep their business booming. A good example is a study by Schuz and colleagues at the Danish Cancer Society and International Epidemiology Institute, but funded by cell phone companies.⁴ This study included more than 420,000 Danes who first started a cell phone subscription between 1982 and 1995, and were followed through 2002 to determine if they were diagnosed with acoustic neuroma, gliomas, or other head cancers. That sounds impressive, but although the study is described as cell phone users "followed for up to 21 years," the average subscription was started only 8.5 years before the study was completed, and only 3% had started using cell phones 15 or more years before the data were analyzed. Therefore, this study did not evaluate people using cell phones for a long enough period to determine if they cause cancer. Individuals with corporate accounts were excluded from the sample, which is also a shortcoming because they were the early adopters and heaviest users. This study reported no increased likelihood of brain cancers for those who used cell phones for more than 10 years; however, cell phone usage in the 1980s and 1990s was much less frequent than it is today. Another shortcoming of this study is that the researchers did not evaluate on which side of the head the phone was used, which was a key variable predicting tumors in other studies.

Recent Studies Indicate Higher Risk

Australian neurosurgeon, Vini Khurana, together with Lennart Hardell and other scientists, conducted a new meta-analysis of 11 studies published in peer-reviewed journals on long-term cell phone use and the risk of developing brain tumors. To be included in this

meta-analysis, the studies had to follow participants for at least ten years and document on which side of the head participants held their phones. Three studies did not meet the second of the two criteria and had to be excluded. The authors concluded, in their article in *Surgical Neurology* in September 2009, that using a cell phone for ten or more years "approximately doubles the risk of being diagnosed with a brain tumor" on the side of the head where the cell phone user holds the phone.⁵

More than half of the studies in the meta-analysis were from the Interphone Project, which is an international effort to investigate possible tumor risks associated with the use of mobile phones in 13 countries. The U.S. is not participating in that research. Interphone studies define "regular cell phone use" as at least one call per week for at least 6 months, and long-term use is defined as at least one call each week for at least 6 years. The Interphone Project is funded by international organizations (World Health Organization, European Commission), taxpayer money from participating countries and by cell phone companies.

The Interphone project has been underway for more than ten years and has cost more than \$24 million. Results were supposed to be published in 2003 and 2006 but have been repeatedly delayed due to the need for more research, conflicts over how to interpret the research, and changes in leadership. Bruce Armstrong, who is leading the Australian team in this project, said in 2008 that the results, while not yet conclusive, indicate a possible health risk.⁶ Newer studies show higher risks because studies in the 1990s were conducted too early, before cancer would have a chance to develop.

However, some scientists are concerned because the frequency of cell phone usage is based on self-reports, not a more objective measure such as usage reported on cell phone bills.

While no one can agree on how to present the *global* Interphone results, individual countries participating in the project, including Sweden, Denmark, France and Israel, have already published their own results.

For example, Dr. Siegal Sadetzki and her colleagues at Tel Aviv University in Israel have found a link between brain tumors and cell phones.⁷ They reported that heavy cell phone users were more likely to have benign or malignant tumors of the salivary gland, compared to those who did not use cell phones. These findings became more worrisome when a recent Hebrew University-Hadassah School of Dental Medicine study found a sharp rise in the number of cases of cancer of the parotid salivary gland in recent years. From 1980 to 2002, there were an average of 25 cases a year in Israel but in the last five years that number has nearly tripled to about 70 cases a year.⁸

Risks for Children

A study published in 2008 in *Physics in Medicine and Biology* revealed that the brains of children under 8 absorb twice as much radiation from cell phones as adult brains.⁹ None of the Interphone Project studies have looked at cell phone use begun in childhood or adolescence but Swedish researcher Lennart Hardell has begun tracking the effects of early cell phone use. According to his research, people who begin using cell phones (and cordless landline phones) before the age of 20 are at an even higher risk of developing

brain tumors than people who begin using these wireless phones as adults.^{10, 11}

Wireless technologies are proliferating daily, and different countries have different limits on radiation from wireless devices, which is why more and better designed research is urgently needed to determine safe levels of exposure. In the meantime, a number of experts are recommending that pregnant women and children limit their cell phone use.

While most cell phone studies have focused on cancer, a study published in the medical journal *Epidemiology* suggests that cell phone exposure could affect children's behavior.¹² The children in the study who were hyperactive or had emotional or behavioral problems, including trouble getting along with other kids were much more likely to have mothers who used cell phones during pregnancy. The children's problems, as reported by their mothers, were even more pronounced for children whose mothers used cell phones both during pregnancy and during their children's first seven years of life. The children of these mothers were 80% more likely to have problems than children whose mothers rarely or didn't use cell phones.

These results, based on a survey of Danish mothers, whose 13,159 children turned 7 in 2005 and 2006, are troubling but also somewhat difficult to interpret. Mothers using cell phones may be paying less attention to their children, causing them to "act out" as a way to seek attention. Research that provides more details of cell phone usage and other factors is needed to interpret the relationship between a mother's cell phone use and her child's behavior.

Precautions You Can Take

Scientists recognize that most people are not going to stop using cell phones. Since many studies suggest that there may be risks, experts like Ronald Herberman, Vini Khurana, and Lennart Hardell recommend that cell phone users take some precautions:

- Limit the number of calls you make.
- Limit the length of your calls.
- Use hands-free devices, put the cell on “speaker phone,” or hold the phone away from your ear..
- When speaking on your cell phone, alternate sides.
- Limit your cell phone use in rural areas or anywhere reception is poor. More radiation is emitted when you are farther from a cell phone tower.
- Text message instead of talking (never while driving!).
- Go over these guidelines with your children and limit their cell phone use.

Remember that cell phones emit radiation whenever they are on—even when they are not in use (although they emit even more during calls). So, avoid

carrying the phone in your pocket or on your belt. You can keep it handy but store it away from your body—in a backpack, purse, or briefcase. If you have to carry it in your pocket, it’s best to turn it off until you need it. And if you use your cell phone as an alarm clock or sleep near it, make sure it is at least a few feet away.

In summary, the published research so far indicates that using cell phones for several years does not have a clear impact on brain tumors or cancers. However, a growing number of studies suggest that tumors may be more common on the side of the head that is used for phone calls, especially for individuals using cell phones for more than 10 years.

Most published studies evaluated relatively infrequent cell phone usage, and that research is inadequate to draw conclusions regarding safety. The health impact of the frequent, long-term use of cell phones that is typical today could potentially be substantially worse and that is why it is important for the Interphone Project to release its results as soon as possible, and for more research on children to be conducted.

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