

Cell Phones: Information for Pediatric Health Professionals

Cell phone use began in the 1980s but did not become widely prevalent until the mid-1990s. There are currently 4.6 billion cell phone subscribers worldwide and cell phone use has become increasingly common among younger segments of the population.¹

Many studies have looked at the potential cancer risk due to electromagnetic frequency radiation from cell phones and cell towers. However, research on the biological mechanisms of cellular and tissue injury by electromagnetic radiation has been inconclusive. Epidemiological studies have been the principal source of evidence on potential health risks of mobile phone use. To date, findings of numerous epidemiologic studies on mobile phone use and brain tumor risk have reported mixed findings, with no clear indication of an increased risk of developing cancer from exposure periods of less than ten years.^{2, 3,4}

What type of radiation do cell phones and cell towers emit?

Humans are exposed to electromagnetic fields from numerous sources every day. Electromagnetic fields produce energy in the form of electromagnetic radiation which can be classified into ionizing radiation and non-ionizing radiation.

Ionizing radiation is any form of radiation with enough energy to detach electrons from atoms or molecules and includes radon, diagnostic X-rays, gamma rays and cosmic rays. This type of radiation can cause DNA damage and gene mutations that may ultimately lead to cancer. Non-ionizing radiation includes radiofrequencies such as radio, television, **cell phones and cell towers**, wireless communications and microwave ovens. It also includes extremely low-frequency electromagnetic fields such as electrical power lines and home appliances. Non-ionizing radiation lacks sufficient energy to detach and ionize molecules. These sources pose varying levels of risk to health, depending upon the source of the radiation, the individual dose level, the cumulative dose over time, and the age at exposure.

Cell phones emit non-ionizing radiation and there has been long-standing public concern regarding the potential adverse health effects from exposure to this particular form of radiation, including an increased risk of cancer. Among the scientific community, however, the evidence is inconclusive regarding the potential health effects from exposure to cell phone radiation.

What is the evidence for harmful effects from cell phone use?

The International Agency for Research on Cancer (IARC), an agency of the World Health Organization, evaluates research on potential carcinogens. In 1998, IARC initiated a large multi-centre study, the INTERPHONE study, on cell phone use and cancer. The case-control study surveyed more than 13,000 mobile phone users in 13 countries from multiple continents over at least a decade. The most recent study results were published in May 2010 and concluded that there was no overall increase in the risk of the two most common types of brain tumors, glioma and meningioma, associated with cell phone use of up to 10

years in adults. There were suggestions of an increased risk of glioma, and much less of meningioma, at the highest exposure levels. However, the authors emphasized that unaccounted for biases and errors in the study limited the strength of these conclusions and prevented a causal interpretation. The study also noted that the long-term effects of heavy cell phone use requires further investigation given the longer latency periods for developing some types of cancer.³

How can I minimize exposure?

Until more definitive data becomes available, cell phone users can reduce their exposure to radiofrequency energy by:

- making fewer calls and reducing the length of calls
- avoid holding the phone against the head or body by sending text messages, using a wired "hands-free" device or using a speaker phone (the exposure falls off rapidly with increasing distance from the handset).
- turning off the cell phone while it is clipped to the belt or inside the pocket and while sleeping next to the phone (the handset only transmits electromagnetic energy when it is turned on)
- using the phone in areas of good reception; the power level that a phone operates at during a call depends on the quality of the link with and the distance from the nearest base station. Poor reception or signal interference occurs when a mobile phone is used in rural areas, when there are physical obstructions between the phone and the base station (such as below ground or inside buildings), or when the phone is used inside of a moving vehicle.

Are there any studies on children and cell phones?

At this time, no long-term epidemiologic studies of cancer risk related to cell phone use by children or adolescents are available. Large cohort studies of children's cell phone use and subsequent cancer risk are underway in Denmark and Norway, and a case-control study of cell phone use during childhood is ongoing in Denmark, Norway, Sweden and Switzerland.⁵

Where can I get more information?

For more information, contact the Mount Sinai Pediatric Environmental Health Specialty Unit, Mount Sinai Medical Center, 1 Gustave L. Levy Place, Box 1057, New York, NY 10029. Phone: 1-866-265-6201. Fax: 212-996-0407. Visit us online at: www.mssm.edu/cpm/pehsu/ You may also contact your local health department or regional EPA office.

¹International Telecommunication Union. Measuring the Information Society (2010) Geneva: International Telecommunication Union.

²President's Cancer Panel. Reducing Environmental Cancer Risk. Annual Report 2008-2009. Available at: [http://www.ph.ucla.edu/ehs/ehs100/other_web_posts/Reducing Environmental Cancer Risk Presidents Cancer Panel Report May 2010.pdf](http://www.ph.ucla.edu/ehs/ehs100/other_web_posts/Reducing_Environmental_Cancer_Risk_Presidents_Cancer_Panel_Report_May_2010.pdf)

³The INTERPHONE Study Group. Brain tumours risk in relation to mobile telephone use: results of the INTERPHONE international case-control study. *Int J Epidemiol* (2010). doi:10.1093/ije/dyq079.

⁴Ahlbom A, Feychting M, Green A, Kheifets L, Savitz DA, Swerdlow AJ. Epidemiologic evidence on mobile phones and tumor risk: a review. *Epidemiology* (2009) 20:639-52.

⁵Linnet MS, Inskip P. Cellular (mobile) telephone use and cancer risk. Presented at the President's Cancer Panel meeting; 2009 Jan 27; Phoenix, AZ.