

**Ten (10) key scientific peer-reviewed publications with evidence supporting  
Private Members Bill C-648 (41st Parliament)  
which would require health warning labelling on cell phones.  
(Press Conference January 19, 2015)**

For more information see: <http://www.c4st.org>

1. Baan, R., Grosse, Y., Lauby-Secretan, B., El Ghissassi, F., Bouvard, V., Benbrahim-Tallaa, L., ... WHO (World Health Organization) International Agency for Research on Cancer Monograph Working Group. (2011). Carcinogenicity of radiofrequency electromagnetic fields. *The Lancet Oncology*, 12(7), 624–626.
2. Carlberg, M., & Hardell, L. (2014). Decreased survival of glioma patients with astrocytoma grade IV (glioblastoma multiforme) associated with long-term use of mobile and cordless phones. *International Journal of Environmental Research and Public Health*, 11(10), 10790–10805.
3. Coureau, G., Bouvier, G., Lebailly, P., Fabbro-Peray, P., Gruber, A., Leffondre, K., ... Baldi, I. (2014). Mobile phone use and brain tumours in the CERENAT case-control study. *Occupational and Environmental Medicine*, 71(7), 514–522.
4. Davis, D. L., Kesari, S., Soskolne, C. L., Miller, A. B., & Stein, Y. (2013). Swedish review strengthens grounds for concluding that radiation from cellular and cordless phones is a probable human carcinogen. *Pathophysiology: The Official Journal of the International Society for Pathophysiology / ISP*, 20(2), 123–129.
5. Divan, H. A., Kheifets, L., Obel, C., & Olsen, J. (2012). Cell phone use and behavioural problems in young children. *Journal of Epidemiology and Community Health*, 66(6), 524–529.
6. Gandhi, O. P., Morgan, L. L., de Salles, A. A., Han, Y.-Y., Herberman, R. B., & Davis, D. L. (2012). Exposure limits: the underestimation of absorbed cell phone radiation, especially in children. *Electromagnetic Biology and Medicine*, 31(1), 34–51.
7. Hardell, L., & Carlberg, M. (2013). Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors associated with use of mobile and cordless phones. *Reviews on Environmental Health*, 28(2-3), 97–106.
8. Hardell, L., Carlberg, M., & Hansson-Mild, K. (2013). Use of mobile phones and cordless phones is associated with increased risk for glioma and acoustic neuroma. *Pathophysiology: The Official Journal of the International Society for Pathophysiology / ISP*, 20(2), 85–110.
9. Hekmat, A., Saboury, A. A., & Moosavi-Movahedi, A. A. (2013). The toxic effects of mobile phone radiofrequency (940 MHz) on the structure of calf thymus DNA. *Ecotoxicology and Environmental Safety*, 88, 35–41.
10. West, J. G., Kapoor, N. S., Liao, S.-Y., Chen, J. W., Bailey, L., & Nagourney, R. A. (2013). Multifocal breast cancer in young women with prolonged contact between their breasts and their cellular phones. *Case Reports in Medicine*, 2013, 1–5.

**All studies are listed in the U.S. National Library of Medicine (PubMed) database.**

<http://www.nlm.nih.gov/>

**All publications, except Baan et al. (2011), were published after the WHO-IARC classification of wireless radiation as a class 2B, possible carcinogen.**

**Abstracts/extracts from these publications are on the following pages.**

**References with abstracts/extracts of 10 scientific peer-reviewed studies with evidence supporting Private Members Bill C-648 (41st Parliament) to require health warning labelling on cell phones.**

Underscoring and bolding have been added.

1. Baan, R., Grosse, Y., Lauby-Secretan, B., El Ghissassi, F., Bouvard, V., Benbrahim-Tallaa, L., ... WHO (World Health Organization) International Agency for Research on Cancer Monograph Working Group. (2011). **Carcinogenicity of radiofrequency electromagnetic fields.** *The Lancet Oncology*, 12(7), 624–626.  
[http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045%2811%2970147-4/fulltext?\\_eventId=login](http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045%2811%2970147-4/fulltext?_eventId=login)

EXTRACT: “In May, 2011, 30 scientists from 14 countries met at the International Agency for Research on Cancer (IARC) in Lyon, France, to assess the carcinogenicity of radiofrequency electromagnetic fields (RF-EMF)...

Human exposure to RF-EMF (frequency range 30kHz - 300 GHz) can occur from the use of personal devices (e.g. mobile phones...)...

Holding a mobile phone to the ear to make a voice call can result in high specific RF energy absorption-rate (SAR) values in the brain...

In view of the limited evidence in humans and in experimental animals, **the Working Group classified RF-EMF as ‘possibly carcinogenic to humans’** (Group 2B). This evaluation was supported by a large majority of the Working Group members.”

2. Carlberg, M., & Hardell, L. (2014). **Decreased survival of glioma patients with astrocytoma grade IV (glioblastoma multiforme) associated with long-term use of mobile and cordless phones.** *International Journal of Environmental Research and Public Health*, 11(10), 10790–10805.  
<http://www.ncbi.nlm.nih.gov/pubmed/25325361>

ABSTRACT: “On 31 May 2011 the WHO International Agency for Research on Cancer (IARC) categorised radiofrequency electromagnetic fields (RF-EMFs) from mobile phones, and from other devices that emit similar non-ionising electromagnetic fields, as a Group 2B, i.e., a ‘possible’, human carcinogen. A causal association would be strengthened if it could be shown that the use of wireless phones has an impact on the survival of glioma patients. We analysed survival of 1678 glioma patients in our 1997-2003 and 2007-2009 case-control studies. Use of wireless phones in the >20 years latency group (time since first use) yielded an increased hazard ratio (HR) = 1.7, 95% confidence interval (CI) = 1.2-2.3 for glioma. For astrocytoma grade IV (glioblastoma multiforme; n = 926) mobile phone use yielded HR = 2.0, 95% CI = 1.4-2.9 and cordless phone use HR = 3.4, 95% CI = 1.04-11 in the same latency category. The hazard ratio for astrocytoma grade IV increased statistically significant per year of latency for wireless phones, HR = 1.020, 95% CI = 1.007-1.033, but not per 100 h cumulative use, HR = 1.002, 95% CI = 0.999-1.005. HR was not statistically significant increased for other types of glioma. **Due to the relationship with survival the classification of IARC is strengthened and RF-EMF should be regarded as human carcinogen requiring urgent revision of current exposure guidelines.**”

3. Coureau, G., Bouvier, G., Lebailly, P., Fabbro-Peray, P., Gruber, A., Leffondre, K., ... Baldi, I. (2014). Mobile phone use and brain tumours in the CERENAT case-control study. *Occupational and Environmental Medicine*, 71(7), 514–522.  
<http://www.ncbi.nlm.nih.gov/pubmed/24816517>

ABSTRACT: “The carcinogenic effect of radiofrequency electromagnetic fields in humans remains controversial. However, it has been suggested that they could be involved in the aetiology of some types of brain tumours. Objectives. The objective was to analyse the association between mobile phone exposure and primary central nervous system tumours (gliomas and meningiomas) in adults. Methods. CERENAT is a multicenter case-control study carried out in four areas in France in 2004–2006. Data about mobile phone use were collected through a detailed questionnaire delivered in a face-to-face manner. Conditional logistic regression for matched sets was used to estimate adjusted ORs and 95% CIs. Results . A total of 253 gliomas, 194 meningiomas and 892 matched controls selected from the local electoral rolls were analysed. No association with brain tumours was observed when comparing regular mobile phone users with non-users (OR=1.24; 95% CI 0.86 to 1.77 for gliomas, OR=0.90; 95% CI 0.61 to 1.34 for meningiomas). However, the positive association was statistically significant in the heaviest users when considering life-long cumulative duration ( $\geq 896$  h, OR=2.89; 95% CI 1.41 to 5.93 for gliomas; OR=2.57; 95% CI 1.02 to 6.44 for meningiomas) and number of calls for gliomas ( $\geq 18$  360 calls, OR=2.10, 95% CI 1.03 to 4.31). Risks were higher for gliomas, temporal tumours, occupational and urban mobile phone use. **Conclusions. These additional data support previous findings concerning a possible association between heavy mobile phone use and brain tumours.**”

4. Davis, D. L., Kesari, S., Soskolne, C. L., Miller, A. B., & Stein, Y. (2013). Swedish review strengthens grounds for concluding that radiation from cellular and cordless phones is a probable human carcinogen. *Pathophysiology: The Official Journal of the International Society for Pathophysiology / ISP*, 20(2), 123–129.  
<http://www.ncbi.nlm.nih.gov/pubmed/?term=Swedish+review+strengthens+grounds+for+concluding+that+radiation+from+cellular+and+cordless+phones+is+a+probable+human+carcinogen>.

ABSTRACT: “With 5.9 billion reported users, mobile phones constitute a new, ubiquitous and rapidly growing exposure worldwide. Mobile phones are two-way microwave radios that also emit low levels of electromagnetic radiation. Inconsistent results have been published on potential risks of brain tumors tied with mobile phone use as a result of important methodological differences in study design and statistical power. Some studies have examined mobile phone users for periods of time that are too short to detect an increased risk of brain cancer, while others have misclassified exposures by placing those with exposures to microwave radiation from cordless phones in the control group, or failing to attribute such exposures in the cases. In 2011, the World Health Organization, International Agency for Research on Cancer (IARC) advised that electromagnetic radiation from mobile phone and other wireless devices constitutes a ‘possible human carcinogen,’ 2B. Recent analyses not considered in the IARC review that take into account these methodological shortcomings from a number of authors find that brain tumor risk is significantly elevated for those who have used mobile phones for at least a decade. Studies carried out in Sweden indicate that those who begin using either cordless or mobile phones regularly before age 20 have greater than a fourfold increased risk of ipsilateral glioma. **Given that treatment for a single case of brain cancer can cost between \$100,000 for radiation therapy alone and up to \$1 million depending on drug costs, resources to address this illness are already in short supply and not universally available in either developing or developed countries. Significant additional shortages in oncology services are expected at the current growth of cancer. No other environmental carcinogen has produced evidence of an increased risk in just one decade.** Empirical data have shown a difference in the dielectric properties of tissues as a function of age, mostly due to the higher water content in children’s tissues. High resolution computerized models based on human imaging data suggest that children are indeed more susceptible to the effects of EMF exposure at microwave frequencies. If the increased brain cancer risk found in young users in these recent studies does apply at the global level, the gap between supply and demand for oncology services will continue to widen. Many nations, phone manufacturers, and expert groups, advise prevention in light of these concerns by taking the simple precaution of ‘distance’ to minimize exposures to the brain and body. We note that brain cancer is the proverbial ‘tip of the iceberg’; the rest of the body is also showing effects other than cancers.”

5. Divan, H. A., Kheifets, L., Obel, C., & Olsen, J. (2012). Cell phone use and behavioural problems in young children. *Journal of Epidemiology and Community Health*, 66(6), 524–529.  
<http://www.ncbi.nlm.nih.gov/pubmed/?term=Cell+phone+use+and+behavioural+problems+in+young+children>.

ABSTRACT: “Background. Potential health effects of cell phone use in children have not been adequately examined. As children are using cell phones at earlier ages, research among this group has been identified as the highest priority by both national and international organisations. The authors previously reported results from the Danish National Birth Cohort (DNBC), which looked at prenatal and postnatal exposure to cell phone use and behavioural problems at age 7 years. Exposure to cell phones prenatally, and to a lesser degree postnatally, was associated with more behavioural difficulties. The original analysis included nearly 13 000 children who reached age 7 years by November 2006. Methods. To see if a larger, separate group of DNBC children would produce similar results after considering additional confounders, children of mothers who might better represent current users of cell phones were analysed. This ‘new’ dataset consisted of 28 745 children with completed Age-7 Questionnaires to December 2008. Results. The highest OR for behavioural problems were for children who had both prenatal and postnatal exposure to cell phones compared with children not exposed during either time period. The adjusted effect estimate was 1.5 (95% CI 1.4 to 1.7). **Conclusions. The findings of the previous publication were replicated in this separate group of participants demonstrating that cell phone use was associated with behavioural problems at age 7 years in children,** and this association was not limited to early users of the technology. Although weaker in the new dataset, even with further control for an extended set of potential confounders, the associations remained.”

6. Gandhi, O. P., Morgan, L. L., de Salles, A. A., Han, Y.-Y., Herberman, R. B., & Davis, D. L. (2012). Exposure limits: the underestimation of absorbed cell phone radiation, especially in children. *Electromagnetic Biology and Medicine*, 31(1), 34–51.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=Exposure+limits%3A+the+underestimation+of+absorbed+cell+phone+radiation%2C+especially+in+children>.

ABSTRACT: “**The existing cell phone certification process uses a plastic model of the head called the Specific Anthropomorphic Mannequin (SAM), representing the top 10% of U.S. military recruits in 1989 and greatly underestimating the Specific Absorption Rate (SAR) for typical mobile phone users, especially children.** A superior computer simulation certification process has been approved by the Federal Communications Commission (FCC) but is not employed to certify cell phones. In the United States, the FCC determines maximum allowed exposures. Many countries, especially European Union members, use the ‘guidelines’ of International Commission on Non-Ionizing Radiation Protection (ICNIRP), a non governmental agency. Radiofrequency (RF) exposure to a head smaller than SAM will absorb a relatively higher SAR. Also, SAM uses a fluid having the average electrical properties of the head that cannot indicate differential absorption of specific brain tissue, nor absorption in children or smaller adults. **The SAR for a 10-year old is up to 153% higher than the SAR for the SAM model.** When electrical properties are considered, a child’s head’s absorption can be over two times greater, and absorption of the skull’s bone marrow can be ten times greater than adults. Therefore, a new certification process is needed that incorporates different modes of use, head sizes, and tissue properties. Anatomically based models should be employed in revising safety standards for these ubiquitous modern devices and standards should be set by accountable, independent groups.”

7. Hardell, L., & Carlberg, M. (2013). Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors associated with use of mobile and cordless phones. *Reviews on Environmental Health*, 28(2-3), 97–106.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=Using+the+Hill+viewpoints+from+1965+for+evaluating+strengths+of+evidence+of+the+risk+for+brain+tumors+associated+with+use+of+mobile+and+cordless+phones>.

ABSTRACT: “Background: Wireless phones, i.e., mobile phones and cordless phones, emit radiofrequency electromagnetic fields (RF-EMF) when used. An increased risk of brain tumors is a major concern. The International Agency for Research on Cancer (IARC) at the World Health Organization (WHO) evaluated the carcinogenic effect to humans from RF-EMF in May 2011. It was concluded that RF-EMF is a group 2B, i.e., a ‘possible’, human carcinogen. Bradford Hill gave a presidential address at the British Royal Society of Medicine in 1965 on the association or causation that provides a helpful framework for evaluation of the brain tumor risk from RF-EMF. Methods: All nine issues on causation according to Hill were evaluated. Regarding wireless phones, only studies with long-term use were included. In addition, laboratory studies and data on the incidence of brain tumors were considered. Results: The criteria on strength, consistency, specificity, temporality, and biologic gradient for evidence of increased risk for glioma and acoustic neuroma were fulfilled. Additional evidence came from plausibility and analogy based on laboratory studies. Regarding coherence, several studies show increasing incidence of brain tumors, especially in the most exposed area. Support for the experiment came from antioxidants that can alleviate the generation of reactive oxygen species involved in biologic effects, although a direct mechanism for brain tumor carcinogenesis has not been shown. In addition, the finding of no increased risk for brain tumors in subjects using the mobile phone only in a car with an external antenna is supportive evidence. Hill did not consider all the needed nine viewpoints to be essential requirements. **Conclusion: Based on the Hill criteria, glioma and acoustic neuroma should be considered to be caused by RF-EMF emissions from wireless phones and regarded as carcinogenic to humans, classifying it as group 1\* according to the IARC classification.** Current guidelines for exposure need to be urgently revised.”

\* Group 1: The agent is carcinogenic to humans.

8. Hardell, L., Carlberg, M., & Hansson-Mild, K. (2013). Use of mobile phones and cordless phones is associated with increased risk for glioma and acoustic neuroma. *Pathophysiology: The Official Journal of the International Society for Pathophysiology / ISP*, 20(2), 85–110.

<http://www.ncbi.nlm.nih.gov/pubmed/24192496>

ABSTRACT: “The International Agency for Research on Cancer (IARC) at WHO evaluation of the carcinogenic effect of RF-EMF on humans took place during a 24-31 May 2011 meeting at Lyon in France. The Working Group consisted of 30 scientists and categorised the radiofrequency electromagnetic fields from mobile phones, and from other devices that emit similar non-ionising electromagnetic fields (RF-EMF), as Group 2B, i.e., a ‘possible’, human carcinogen. The decision on mobile phones was based mainly on the Hardell group of studies from Sweden and the IARC Interphone study. We give an overview of current epidemiological evidence for an increased risk for brain tumours including a meta-analysis of the Hardell group and Interphone results for mobile phone use. Results for cordless phones are lacking in Interphone. The meta-analysis gave for glioma in the most exposed part of the brain, the temporal lobe, odds ratio (OR)=1.71, 95% confidence interval (CI)=1.04-2.81 in the ≥10 years (>10 years in the Hardell group) latency group. Ipsilateral mobile phone use ≥1640h in total gave OR=2.29, 95% CI=1.56-3.37. The results for meningioma were OR=1.25, 95% CI=0.31-4.98 and OR=1.35, 95% CI=0.81-2.23, respectively. Regarding acoustic neuroma ipsilateral mobile phone use in the latency group ≥10 years gave OR=1.81, 95% CI=0.73-4.45. For ipsilateral cumulative use ≥1640h OR=2.55, 95% CI=1.50-4.40 was obtained. Also use of cordless phones increased the risk for glioma and acoustic neuroma in the Hardell group studies. Survival of patients with glioma was analysed in the Hardell group studies yielding in the >10 years latency period hazard ratio (HR)=1.2, 95% CI=1.002-1.5 for use of wireless phones. This increased HR was based on results for astrocytoma WHO grade IV (glioblastoma multiforme). **Decreased HR was found for low-grade astrocytoma, WHO grades I-II, which might be caused by RF-EMF exposure leading to tumour-associated symptoms and earlier detection and surgery with better prognosis.** Some studies show increasing incidence of brain tumours whereas other studies do not. It is concluded that one should be careful using incidence data to dismiss results in analytical epidemiology. The IARC carcinogenic classification does not seem to have had any significant impact on governments’ perceptions of their responsibilities to protect public health from this widespread source of radiation.”

9. Hekmat, A., Saboury, A. A., & Moosavi-Movahedi, A. A. (2013). The toxic effects of mobile phone radiofrequency (940 MHz) on the structure of calf thymus DNA. *Ecotoxicology and Environmental Safety*, 88, 35–41.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=The+toxic+effects+of+mobile+phone+radiofrequency+%28940+MHz%29+on+the+structure+of+calf+thymus+DNA>

ABSTRACT: “Currently, the biological effects of nonionizing electromagnetic fields (EMFs) including radiofrequency (RF) radiation have been the subject of numerous experimental and theoretical studies. The aim of this study is to evaluate the possible biological effects of mobile phone RF (940 MHz, 15 V/m and SAR=40 mW/kg)\* on the structure of calf thymus DNA (ct DNA) immediately after exposure and 2 h after 45 min exposure via diverse range of spectroscopic instruments. The UV-vis and circular dichroism (CD) experiments depict that mobile phone EMFs can remarkably cause disturbance on ct DNA structure. In addition, the DNA samples, immediately after exposure and 2 h after 45 min exposure, are relatively thermally unstable compared to the DNA solution, which was placed in a small shielded box (unexposed ct DNA). Furthermore, the exposed DNA samples (the DNA samples that were exposed to 940 MHz EMF) have more fluorescence emission when compared with the unexposed DNA, which may have occurred attributable to expansion of the exposed DNA structure. The results of dynamic light scattering (DLS) and zeta potential experiments demonstrate that RF-EMFs lead to increment in the surface charge and size of DNA. The structure of DNA immediately after exposure is not significantly different from the DNA sample 2 h after 45 min exposure. In other words, the EMF-induced conformational changes are irreversible. Collectively, **our results reveal that 940 MHz can alter the structure of DNA.** The displacement of electrons in DNA by EMFs may lead to conformational changes of DNA and DNA disaggregation. Results from this study could have an important implication on the health effects of RF-EMFs exposure. In addition, this finding could proffer a novel strategy for the development of next generation of mobile phone.”

\* SAR limits established in Health Canada's RF exposure guidelines entitled: *Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz - Safety Code 6* are 1.6W/kg (1,600 mW/kg) for the localized head and trunk and 4.0W/kg (4,000 mW/kg) for localized limbs.  
[http://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/h\\_tt00084.html](http://www.ic.gc.ca/eic/site/ceb-bhst.nsf/eng/h_tt00084.html)

\*\* DNA damage in this frequency range (at below Safety Code 6 guidelines) has been demonstrated in several earlier studies by other researchers. These have been published in peer-reviewed journals.

10. West, J. G., Kapoor, N. S., Liao, S.-Y., Chen, J. W., Bailey, L., & Nagourney, R. A. (2013). Multifocal breast cancer in young women with prolonged contact between their breasts and their cellular phones. *Case Reports in Medicine*, 2013, 1–5.

<http://www.ncbi.nlm.nih.gov/pubmed/?term=Multifocal+breast+cancer+in+young+women+with+prolonged+contact+between+their+breasts+and+their+cellular+phones>

ABSTRACT: “Breast cancer occurring in women under the age of 40 is uncommon in the absence of family history or genetic predisposition, and prompts the exploration of other possible exposures or environmental risks. We report a case series of four young women—ages from 21 to 39—with multifocal invasive breast cancer that raises the concern of a possible association with nonionizing radiation of electromagnetic field exposures from cellular phones. All patients regularly carried their smartphones directly against their breasts in their brassieres for up to 10 hours a day, for several years, and developed tumors in areas of their breasts immediately underlying the phones. **All patients had no family history of breast cancer, tested negative for BRCA1 and BRCA2, and had no other known breast cancer risks. Their breast imaging is reviewed, showing clustering of multiple tumor foci in the breast directly under the area of phone contact.** Pathology of all four cases shows striking similarity; all tumors are hormone-positive, low-intermediate grade, having an extensive intraductal component, and all tumors have near identical morphology. **These cases raise awareness to the lack of safety data of prolonged direct contact with cellular phones.**”