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Smart Meter and Cancer Risk Statement

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Personal exposure to radiofrequency radiation (RF), through the use of cell phones, has increased dramatically, since their introduction in the mid- to late-1980s. The expanding use of this technology has been accompanied by concerns about public health. Therefore, since that time, there has been extensive research into the health effects, including cancer effects, of exposure to RF. These studies included (1) laboratory studies of biological effects on cells, which provide information on possible mechanisms by which RF could cause cancer; (2) studies of effects in animals, which provide information on whether biological changes lead to health-related change; and (3) direct observation and assessment of cancer risk in humans.

Smart Meters emit RF radiation, but only intermittently, and at a level several times below that of the highest level of personal exposures from cell phones, and well below existing limits for RF exposure to the public. Smart Meters generate an RF signal an average of one minute per day. In addition, Smart Meters emit very low power – about one watt. This is less than 2 microwatts per square centimetre ($\mu\text{W}/\text{cm}^2$) when standing adjacent to the meter. A microwatt is one millionth of a watt. And, exposure to RF drops quickly with distance from the device. Three meters (10 feet) from the smart meter, the radio frequency signal drops to less than 0.001 per cent ($0.005 \mu\text{W}/\text{cm}^2$) of the Health Canada exposure limits. This exposure level is much less than exposure to RF from cell phone use.

However, since both cell phones and Smart Meters emit RF, the research into RF exposures for cell phones is relevant to an understanding of cancer risk from Smart Meters.

First, it is important to note that brain tumour rates in adults and children have not increased with increasing cell phone use, in Canada and elsewhere. Major recent studies of cell phone use and brain cancer include the *Interphone study*, the largest case-control study ever undertaken, that compared the RF exposures, as determined by cell phone usage, of those who developed a brain tumour and those who did not; a five-country case-control study of a rare tumour called "acoustic neuroma", a slow-growing tumor of the nerve that connects the ear to the brain, and a *Danish study* of 365,000 cell phone subscribers in the country, whose subscriber records were linked to the population cancer records to determine cancer rates by extent of cell phone use.

The Interphone study (2010) reported that, although estimates of risk of brain tumour were the same or lower for most groups of users, there was a statistically higher risk of glioma, a malignant type of brain tumour, observed among the few cases who had used a cell phone 20 years or more. The authors concluded that "because of biases and errors inherent in the study design, the results could not be interpreted as meaning that RF exposure actually was the cause of the excess risk of brain tumours".

Subsequent to publication of the Interphone study, a multidisciplinary working group of 31 experts convened by the International Agency for Research on Cancer (IARC), the cancer research arm of the World Health Organization, reviewed all the published research to date. They concluded that there was *limited evidence of carcinogenicity* (IARC Classification 2B): that is, "a positive association (had) been observed between exposure to (RF) and cancer, for which a causal interpretation is considered ... to be credible, but chance, bias or confounding could not be ruled out with reasonable confidence".

Following the publication of the Interphone study, a report summarizing the IARC Working Group review (The Lancet Oncology, July 2011) concluded that the Interphone results, "along with those from other epidemiological, biological, and animal studies, and brain tumour incidence trends, suggest that within the first 10-15 years of exposure to RF radiation from cell phones, the period of use examined in Interphone, there is unlikely to be a material increase in brain tumours in adults".

The report also concluded that, "although there remains some uncertainty, the trend in the accumulating evidence was increasingly against the hypothesis that (RF radiation from) mobile phone use can cause brain tumours in adults."

Subsequently, the large Danish study, whose study design is not subject to the same bias and error as the Interphone study, did not find any excess risk of brain tumours among any group of cell phone users, even those with heavy or long-term use.

The five-country study of acoustic neuroma (2005) also did not find any evidence of excess risk with duration of use, although there were only a few cases who had used cell phones for more than 10 years.

The evidence, therefore, does not support a conclusion that RF fields, whether from cell phones or Smart Meters, can cause brain tumours or acoustic neuromas in adults. There is so far little direct human data on those with more than 20 years' cell phone use, and limited information on risk of other cancers, but the limited information we have is generally negative. There is also no direct information on children. More studies, to address these gaps in our understanding of RF and cancer risk, are underway. However, the extensive laboratory research to date has not identified any mechanisms that could operate in either adults or children that would lead to an excess risk of tumours in general.

Additional information can be found on the following websites:

BC Cancer Agency Recommended Websites - Electromagnetics (& radiofrequency) and Radiation

<http://www.bccancer.bc.ca/PPI/RecommendedLinks/causesprevention/electromagnetics.htm>

<http://www.bccancer.bc.ca/PPI/RecommendedLinks/causesprevention/radiation.htm>

BC Centre for Disease Control - Smart meters

<http://www.bccdc.ca/healthenv/Radiation/ElectromagRadiation/SmartMeters.htm>

BC Provincial Health Officer - cell phones, radiofrequency waves

<http://www.health.gov.bc.ca/pho/issues.html>

Health Canada - Smart meters

<http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/prod/meters-compteurs-eng.php>

BC Hydro's information and links on radiofrequency and smart meters

http://www.bchydro.com/energy_in_bc/projects/smart_metering_infrastructure_program/faqs/radio_frequency.html?WT.mc_id=rd_metersafety

