

Dr. Paul Demers

Chair of the Royal Society of Canada's Expert Panel Reviewing Safety Code 6

c/o Russel MacDonald at admin-assistant@rsc-src.ca

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Dr. Demers,

Please accept this submission which I am making at the request of Mr. Frank Clegg, CEO of Canadians for Safe Technology (C4ST).

The main point of my submission is to draw your attention to some of the considerable body of scientific evidence conducted by experimental biologists confirming the existence of non-thermal effects on humans from exposure to non-ionizing radio frequency/microwave radiation.

My background

I am currently President, Environmental Health Trust, and Scientific Advisor to Healthy Child, Healthy World, and Visiting Scholar at the University of California Berkeley, Goldman School of Public Policy. I hold numerous awards and commendations, including a National Book Award and a Silver Medal from Nautilus Books for Courageous Reporting for my book, *Disconnect—the truth about cell phone radiation, what industry has done to hide it, and how to protect your family*, Dutton:Plume, 2010, 2011, which has been translated into 6 languages. I also was a Lead Author of the Intergovernmental Panel on Climate Change, the group awarded the Nobel Peace Prize in 2007, with Al Gore. I held a Senate confirmed Presidential appointment from 1994-99, as a member of the National Chemical Safety and Hazard Investigation Board. From 1983-93, I worked at the U.S. National Academy of Sciences, as Founding Director of the Board on Environmental Studies and Toxicology and Scholar in Residence. I also founded the Center for Environmental Oncology of the University of Pittsburgh Cancer Institute, 2005-2010 and have authored more than 200 books and articles that have been translated into more than a dozen languages. I have served as an advisor to the World Bank, World Health Organization, and state, local and national authorities including the U.S. National Toxicology Program, the National Institutes of Health, and the Centers for Disease Control and Prevention.

My main focus recently has been on health effects due to cell phone exposure particularly as it relates to children but I will touch on other aspects on the non thermal effects of radio frequency/microwave radiation. I am an epidemiologist. I study disease and what causes it. We've had escalating brain cancer rates in the population that science shows are not only associated with cell phone usage but also how and why this is happening. The evidence clearly shows people who hold their phones too long and close to their body tend to have a higher rate of this cancer. I have conducted and published in leading journals epidemiological research on patterns of brain cancer and other diseases, and brain modeling estimations regarding exposure to microwave radiation from cell phones in persons of varying ages and head sizes. My results indicated that cell phone radiation is absorbed twice as deeply into the young brain than the adult brain, and that the bone marrow of the young skull absorbs twice as much radiation as does that of the adult (Gandhi et al., 2012).

In the November 2012 issue of San Francisco Medicine, I wrote: A cell phone is a two-way microwave radio with intermittent and destabilizing pulses, unlike microwave ovens that steadily operate at the same frequencies at much greater power. The weak and erratic microwave radiation from cell phones and tablets cannot directly break the bonds that hold molecules together, but it does disrupt DNA, weaken the brain's protective barrier, and release highly reactive and damaging free radicals.

A five-year-old's brain, healthy or otherwise, is encased in a thinner skull and contains more fluid than an adult brain. According to studies carried out by industry modelers in Switzerland and France, the bone marrow of a child's head absorbs 10 times more radiation than that of an adult, while that of infants and toddlers will absorb even more. Analyses of published studies on brain cancer risk find that those who begin using cell phones regularly before their twenties have between 4 to 8 times greater risk of brain cancer within a decade of beginning such regular exposures (Davis et al., 2013).

I conclude as do numerous colleagues from the Health Ministry of Israel, the Nuclear Radiation and Safety Authority of Finland, and Australia's Radiation and Nuclear Protection Agency that additional precautions are warranted for children. Christ et al. have demonstrated that exposure to radiofrequencies in the brain from cellphone calls is higher in toddlers and children than adults (Christ et al., 2010). They found several "major age-dependent changes" (p.1780), ultimately due to the distance between the radiation source and the respective brain region. These included increased energy absorption (SAR) in young children of 2 dB to 5 dB in some brain regions, such as the hippocampus and hypothalamus; absorption in bone marrow 10-fold higher than in adults; and greater absorption in the eyes of children than adults.

I recommend that the Expert Panel give full consideration to the recent publications by Dr. Hardell and colleagues (Hardell et al. 2012, 2013) where they provide new and compelling evidence for re-evaluation of the WHO/IARC classification of a "possible carcinogen", with a view to changing that assessment of wireless radiation from mobile phones, cordless phones, and other wireless devices to at least a "probable human carcinogen" i.e. Group 2A. No other environmental carcinogen has produced evidence of such an increased risk in one decade.

The implications for future health care costs if these projections are correct are staggering. In the USA the 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.

Aside from brain cancer, also disconcerting are findings from Nesrin Seyhan, the NATO-supported founding chairman of the Biophysics Department at Gazi University in Ankara, Turkey, whose controlled studies show that prenatally exposed rats and rabbits have fewer brain cells—and those that survive sustain more damage to their brains, livers, reproductive systems and eyes. Recent reports from Yale University's chief of obstetrics and gynecology, Hugh Taylor, found that prenatal exposure significantly increased hyperactive behavior in offspring and altered brain chemistry. Other research carried out by renowned National Institute of Drug Abuse Director Nora Volkow, MD, PhD, finds that just 50 minutes of exposure to cell phone radiation in adult males directly alters the production of glucose—the brain's main fuel. Experimental work completed by American, Australian, Greek, and Turkish teams working with experts in male reproductive health has reported that cell phone-radiation-exposed human sperm die three times faster, swim significantly more poorly, become more deformed, and develop significantly more damage to sperm DNA.

How is this possible? After all, headlines have repeatedly assured us that there's little to worry about, because we do not face an epidemic of brain cancer—yet. In fact, the brain cancer story remains complex, because the disease has a long latency—up to four decades—and because past uses and users differ radically from current ones. But evidence on dangers to pregnancy and reproduction from cell phone use are mounting. Of course, not all studies find results, but those that do—especially recent efforts at Yale and the Cleveland Clinic—cannot simply be ignored because others do not find similar results.

The proliferation of wireless devices overlooks a critical health issue—non-ionizing microwave radiation, at levels that do not induce measurable changes in temperature, can change and damage the brain and sperm. Do we want to let our children be imperiled with more and more cancers of the brain or testicles?

On behalf of Environmental Health Trust, I urge the Expert Panel reviewing Safety Code 6 to investigate fully the studies that show non-thermal effects of non-ionizing radio frequency/microwave radiation and recommend changes to the current safety guidelines accordingly.

Respectfully submitted by
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List of references

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Other publications and relevant information can be found at

<http://ehtrust.org/recent-articles-devra-davis/>