

Royal Society of Canada Expert Panel  
Review of Safety Code 6: Potential Health  
Risks of Radiofrequency Fields from Wireless  
Telecommunications Devices  
Spring 2014



## PUBLIC SUMMARY

A large number of industrial and consumer technologies operate using radiofrequency (RF) energy, which consists of electric and magnetic fields. To protect the public from adverse health effects from exposure to radiofrequency fields, Health Canada established Safety Code 6 (SC6) in 1991. It sets recommended limits for safe human exposure to RF energy emitted from devices such as cellular telephones, Wi-Fi equipment, cellular phone towers, radar and radio/TV broadcast antennas. For the general public, by far the most frequent source of exposure is through personal use of cell phones.

Health Canada regularly reviews SC6 to ensure that it is based on the most up-to-date scientific knowledge. In 2013, it proposed several revisions to bring SC6 in line with current knowledge and other international standards and asked the Royal Society of Canada to form an Expert Panel to review the proposed changes to SC6. The Panel was asked to determine whether SC6 limits provide adequate protection from established adverse health effects, whether there are other potential health impacts that should be considered, and whether additional precautionary measures should be recommended. This report outlines the evidence considered by the Panel and presents their response to the questions posed by the Royal Society. In addition, the Panel identified where there are gaps in the current state of knowledge and where further research is warranted.

The Panel considered an “established adverse health effect” as an adverse effect that is observed consistently in several studies with strong methodology. With this definition in mind, the Panel reviewed the evidence for a wide variety of negative health impacts from exposure to RF energy, including cancer, cognitive and neurologic effects, male and female reproductive effects, developmental effects, cardiac function and heart rate variability, electromagnetic hypersensitivity, and adverse health effects in susceptible regions of the eye.

Many of the studies considered reached conflicting conclusions. For example, the Panel reviewed conflicting evidence about effects of exposure to RF energy on cancer, concluding that effects are possible but are not “established” in accordance with its definition of “established health effects”. The Panel’s conclusion on cancer is in agreement with a recent report from the International Agency for Research on Cancer (IARC, 2013). Similarly, while effects of exposure to RF energy on aspects of male reproductive function have been found, the evidence has not been established to indicate that these translate into fertility or health effects. Problems in study design and inadequate dosimetry make it difficult to interpret the results of many of these reproductive health studies.

Therefore, the Panel has concluded that the balance of evidence at this time does not indicate negative health effects from exposure to RF energy below the limits recommended in the Safety Code. However, research on many of these health effects is ongoing and it is possible that the findings of future studies may alter this balance of evidence. The Panel recommends that Health Canada should continue to monitor the literature for emerging evidence and that it aggressively pursue scientific research aimed at clarifying

the RF energy-cancer issue and at further investigating the question of electromagnetic hypersensitivity, in particular.

Within the constraints of available resources and time, the Panel reviewed the scientific literature on biological effects of radiofrequency fields. This literature includes a number of reports of effects in various biological systems at exposure levels below recommended SC6 limits. In general, these reported low-level effects are often not consistent across similar studies and have no clear implications with respect to human health. Consequently they cannot presently be used to design safety standards. The Panel recommends that Health Canada continue to evaluate this literature as it develops.

Available studies suggest that the basic restrictions recommended in Safety Code 6 do provide adequate protection against known adverse health effects across the radiofrequency range. However, the science of exposure measurement is still developing and further research is required to not only examine the effects of exposure to new and emerging technologies, but also to compare the effectiveness of the recommended reference levels against the findings of new studies. In particular, the Panel recommends that Health Canada should consider studies in which additional data has been collected on child exposure, postured adult and postured child exposure, pregnant female and newborn exposure under grounded and isolated conditions.

During the public consultation, the Panel heard a number of significant concerns about the health effects of RF energy, the increasing levels of public exposure to RF energy, the process used to review the Safety Code, and the need for improved risk communication activities. While the Panel concluded that the human exposure limits in the Safety Code are science-based and do reflect the current state of knowledge regarding health effects, the Panel recommends that Health Canada continue to improve its efforts to inform the public regarding this issue and provide practical advice to concerned consumers on how to reduce their personal or their children's exposure. The Panel also urges Health Canada to investigate the problems of sensitive individuals with the aim of understanding their condition and finding ways to provide effective treatment, develop a procedure for the public to report suspected disease clusters and a protocol for investigating them, and encourage inclusion of basic education on non-ionizing radiation in the curriculum of Canadian medical schools.