HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

Standing Committee on Health

HESA • NUMBER 054 • 2nd SESSION • 41st PARLIAMENT

EVIDENCE

Tuesday, March 24, 2015

Chair

Mr. Ben Lobb

Standing Committee on Health

Tuesday, March 24, 2015

● (1530)

[*English*]

The Chair (Mr. Ben Lobb (Huron—Bruce, CPC)): Good afternoon, ladies and gentlemen. We're here to begin our brief study on Health Canada Safety Code 6. We have a number of witnesses here today, two panels and some departmental officials as well.

Who would like to go first among the departmental officials?

Mr. Adams, go ahead, sir.

Mr. Andrew Adams (Director General, Environmental and Radiation Health Sciences Directorate, Department of Health): Thank you very much. I have some opening remarks to make.

Chairman and members of the committee, it is my pleasure to be here today to speak on Health Canada Safety Code 6. My name is Andrew Adams, and I am the director of the environmental and radiation health sciences directorate in the healthy environments and consumer safety branch of Health Canada. I am joined today by Dr. James McNamee, the chief of the health effects and assessments division in the consumer and clinical radiation protection bureau and the lead author of Safety Code 6.

Safety Code 6 is Health Canada's guideline for exposure to radio frequency, or RF, electromagnetic energy, the kind of energy given off by cellphones and Wi-Fi, as well as broadcasting and cellphone towers. Safety Code 6 provides human exposure limits in the 3 kilohertz to 300 gigahertz frequency range, and we have provided chart A of the electromagnetic spectrum, just so committee members can situate the frequency range we're talking about.

But Safety Code 6 does not cover exposure to electromagnetic energy in the optical or ionizing radiation portions of the electromagnetic spectrum. Safety Code 6 establishes limits for safe human exposure to RF energy. These limits incorporate large safety margins to protect the health and safety of all Canadians, including those who work near RF sources.

[*Translation*]

While Safety Code 6 recommends limits for safe human exposure, Health Canada does not regulate the general public's exposure to electromagnetic RF energy.

Industry Canada is the regulator of radiocommunication and broadcasting installations and apparatus in Canada. To ensure that public exposures fall within acceptable guidelines, Industry Canada has developed regulatory standards that require compliance with the human exposure limits outlined in Safety Code 6.

[*English*]

I'd like to talk a little bit about the approach for updates to Safety Code 6. Safety Code 6 is reviewed on a regular basis to verify that the guideline provides protection against all known potentially harmful health effects and that it takes into account recent scientific data from studies carried out worldwide. The most recent update to Safety Code 6 was completed earlier this month. I will describe the process used for that update later in my remarks.

When developing the exposure limits in the revised Safety Code 6, departmental scientists considered all peer-reviewed scientific studies, including those pertaining to both thermal and non-thermal, and employed a weight-of-evidence approach when evaluating possible health risks from exposure to RF energy.

The weight-of-evidence approach takes into account both the quantity of studies on a particular end point and the quality of those studies. Poorly conducted studies receive relatively little weight, while properly conducted studies receive more weight.

Now I'll focus on the recent update of Safety Code 6.

● (1535)

[*Translation*]

The most recent update to Safety Code 6 was initiated in 2012, with the goal of ensuring that the most up-to-date and credible scientific studies on the potential effects of RF energy on human health were reflected in the code.

Health Canada proposed changes to Safety Code 6 that were based on the latest available scientific evidence, including improved modelling of the interaction of RF fields with the human body, and alignment with exposure limits specified by the International Commission on Non-Ionizing Radiation Protection. These changes were proposed to ensure that wide safety margins were maintained to protect the health and safety of all Canadians, including infants and children.

[*English*]

Some of you may recall that this committee previously conducted a study on the potential health impacts of RF electromagnetic radiation. Among the recommendations included in the committee's December 2010 report was a recommendation that:

> Health Canada request that the Council of Canadian Academies or another appropriate independent institution conduct an assessment of the Canadian and international scientific literature regarding the potential health impacts of short and long-term exposure to radiofrequency electromagnetic radiation....

ln response to this recommendation, in 2013, Health Canada contracted the Royal Society of Canada to review the results of emerging research relating to the safety of RF energy on human health, to ensure it was appropriately reflected in the revised Safety Code, through a formalized expert panel process.

I'm sure you know that today we're joined by the chair of the expert panel and one of the members of the expert panel.

The Expert Panel of the Royal Society released their review in March 2014, concluding that in the view of the panel there are no established adverse health effects at exposure levels below the proposed limits.

Among the recommendations made by the expert panel was the suggestion that the proposed reference levels in the draft Safety Code 6 be made slightly more restrictive in some frequency ranges to ensure larger safety margins for all Canadians, including newborn infants and children.

[*Translation*]

ln the interest of openness and transparency, Health Canada also undertook a 60-day public consultation period for the proposed revisions to Safety Code 6 between May and July 2014. The department invited feedback from interested Canadians and stakeholders.

Comments related to the scientific and technical aspects of Safety Code 6 received by Health Canada during the public consultation period, as well as the recommendations provided by the Royal Society Expert Panel, were taken into consideration when finalizing the revised guideline.

[*English*]

The final version of Safety Code 6 was published on March 13, 2015. Health Canada also published a summary of the feedback received during the public consultation period. Given the scientific basis of the guideline, only feedback of a technical or scientific nature could be considered in the finalization of Safety Code 6; however, the summary of consultation feedback responds to both technical and non-technical comments received from Canadians.

[*Translation*]

With the recent update, Canadians should be confident that the radiofrequency exposure limits in Safety Code 6 are now among the most stringent science-based limits in the world.

[*English*]

To shift a little bit and talk about the scientific methodology that underlies the revision of Safety Code 6, a large number of submissions received during the public consultation period raised concerns that Health Canada had not considered all of the relevant scientific literature when updating Safety Code 6. ln particular, it has been stated that 140 studies were ignored. I would like to address that criticism here today.

ln updating Safety Code 6, Health Canada made use of existing internationally recognized reviews of the literature along with its own expert review of the relevant scientific literature. Numerous reviews on this issue have been written in recent years by international organizations such as the World Health Organization, the European Commission's Scientific Committee on Emerging Newly identified Health Risks, and ICNIRP. I believe we have provided links to some of these reports for the committee's interest.

● (1540)

[*Translation*]

While Safety Code 6 references these international reviews, the code is an exposure guideline, not a scientific review article. Accordingly, most individual scientific studies are not referenced in the code. However, this does not mean that Health Canada did not consider all relevant scientific information when deriving the science-based exposure limits in the code. I can assure you we did.

[*English*]

lt should be noted that studies with inappropriate study design or methodology can lead to erroneous results that are scientifically meaningless.

Studies were considered not to be of sufficient quality to inform the recent update if it was not possible to determine the dosage studied, if the study lacked an appropriate control, if experiments within the study were not repeated a sufficient number of times, if no statistical analysis of the results was conducted, or if other improper scientific techniques were used. Of the 140 studies that have been cited, a large number fall into this category.

Other studies were not considered to be within scope. For example, some of these studies looked at exposures to a frequency range outside of the frequency range covered by Safety Code 6 and were therefore not considered relevant.

[*Translation*]

However, Health Canada did consider all studies that were considered to be both in scope and of sufficient quality for inclusion in our risk assessment. While it is true that some of these studies report biological or adverse health effects of RF fields at levels below the limits in Safety Code 6, I want to emphasize that these studies are in the minority and they do not represent the prevailing line of scientific evidence in this area.

[*English*]

The conclusions reached by Health Canada are consistent with reviews of the scientific evidence by national and international health authorities. Of note, the European Commission's Scientific Committee on Emerging and Newly Identified Health Risks earlier this month released its final opinion on the potential health effects of electromagnetic fields. SCENIHR concluded that there are no evident adverse health effects, provided exposure levels remain below levels recommended by European Union legislation.

Now I'd like to talk a little bit about an international comparison. Members of the committee may be wondering how the limits in Safety Code 6 compare with limits in other parts of the world. I refer you to the chart of radio frequency exposure limits for the general public in different countries. Internationally, a few jurisdictions have applied more restrictive limits for RF field exposures from cell towers; however, there is no scientific evidence to support the need for such restrictive limits. Canada's limits are consistent with, if not more stringent than, the science-based limits used in such other jurisdictions as the European Union, the United States, Japan, Australia, and New Zealand.

In conclusion, the health of Canadians is protected form radio frequency electromagnetic energy when the human exposure limits recommended in Safety Code 6 are respected. Safety Code 6 has always established and maintained a human exposure limit that is far below the threshold for potentially adverse health effects. The health of Canadians was protected under the previous version of Safety Code 6, and recent revisions to the code ensure even greater protection.

Health Canada will continue to monitor the scientific literature on this issue on an ongoing basis. Should new evidence arise that indicates a risk to Canadians at levels below the limits in Safety Code 6, the department would take appropriate action.

[*Translation*]

Thank you for your time.

[*English*]

The Chair: Thank you.

Dr. Prato, you have some prepared comments. You can go ahead, sir.

Dr. Frank Prato (Imaging Program Leader, Assistant Scientific Director, Lawson Health Research Institute): My name is Frank Prato. I'm an assistant scientific director and medical imaging program leader at the Lawson Health Research Institute. The Lawson Health Research Institute is one of the largest hospital-based research institutes in Canada and the research institute for the two teaching hospitals in London, Ontario.

I became interested in 1982 in non-ionizing, non-thermal effects when I introduced here in Canada magnetic resonance imaging. We produced the first image in Canada using magnetic resonance imaging in 1982, and I became interested in the potential of non-thermal effects as a result of exposure of biological systems to non-ionizing electromagnetic fields.

I have continued to work in this area and have published about 100 publications. I have some credentials in terms of international credentials. I'm the past president of The Bioelectromagnetics Society, which is the largest society investigating non-ionizing electromagnetic radiation. I'm chairing, for the seventh year now, the Canadian National Committee of the International Union of Radio Science, which is a National Research Council of Canada committee of a scientific union called the International Union of Radio Science. This union looks at applications of non-ionizing electromagnetic radiation. And for the union worldwide, I was a commissioned chair for Commission K, which looks at biological effects of exposure to a non-ionizing radiation.

Given this background, I've been very interested, but my interest generally falls outside of the frequency limits associated with Safety Code 6, which start at three kilohertz. Most of my interest has been at lower frequencies in what is called the ELF range, the extremely low frequency range of around 300 hertz and lower, including frequencies like 50 hertz and 60 hertz that are associated with electrical power transmission.

However, in this area, I published in the international journal of the Royal Society, called *Interface*, in 2013, that exposure to 30-hertz—which, again, is well below the three kilohertz associated with Safety Code 6—ambient electromagnetic fields generated by humans do have effects on biological systems. These were experiments that needed to be carried out under shielded conditions; however, they are not relevant because they fall below the frequency limits associated with Safety Code 6.

I would like to say a few words about non-thermal RF effects below Safety Code 6 limits within the frequency range. There have been a number of problems with this literature as Mr. Adams alluded to. There are three major problems with this literature at this point in time. One is that the effects have been small; two, that there is no established mechanism, and in fact there are a number of people who claim there are no possible mechanisms with such weak energy fields; and three, that there are issues with reproducibility. Reproducibility issues aren't surprising, given that we don't really understand the mechanism.

However, there was an article published very recently in *Nature* , on May 15, 2014, after the release of our article in the Royal Society review, entitled, “Anthropogenic electromagnetic noise disrupts magnetic compass orientation in a migratory bird”. So these are clear non-thermal effects of RF within the range of Safety Code 6 safety.

Now we are getting more and more literature that suggests that very weak fields, below the limits set by Safety Code 6, can have biological effects. Of course, we don't know if these effects occur in humans, and we are not stating that they are detrimental. They were obviously detrimental to the birds in the urban population because it interfered with their ability to sense the earth's magnetic field for a proper orientation and homing.

● (1545)

The question that arose with respect to the discussions of the Royal Society committee on Safety Code 6 is why we cannot set limits for non-thermal effects. I draw you section 7.8, the last paragraph, which says that “it is not known how the reported effects scale with exposure parameters.”

With heating effects, there is a very straightforward metric that we can evaluate and determine what the energy deposition is and what the probability is that the exposed tissue or organism will have a detrimental, perhaps, increase in temperature, but we do not know what the scaling metric is for these non-thermal biological effects.

The definition of non-thermal was also discussed in the Royal Society report. I'll remind you that in that report, we basically said the definition of non-thermal is a bit difficult, but at least we can talk about effects below the limits for Safety Code 6 as being those that would include non-thermal effects.

I'd also like to point out that in section 10.2 of the Royal Society review, the second-to-last bullet says that "Health Canada should pursue research to expand our current understanding of possible effects of exposure to RF energy at levels below SC6."

What I am saying, as a researcher, is that there are now well-established effects in some animals of exposures below those of Safety Code 6. At this point, there is no strong evidence—there is some evidence—that similar effects are reliably reproduced in humans. Also, there is no evidence that these effects would be detrimental to humans if, in fact, they occurred.

Let me point out that the more recent literature that has come out in the last six months or so, and some literature building up to that, suggests some of the studies are quite flawed in this area, because it turns out that magnetic and electric fields produced in the environment do have biological effects. When people have been doing experiments like having one group of individuals with cellphone exposure, and another group just in the lab without cellphone exposure but, say, with sham cellphone exposure, they are still being exposed to magnetic and electric fields which are in the environment. We have evidence now in animals that those magnetic fields generated by humans do have biological effects in a number of species, including mice and birds.

That's basically what I am saying. I am trying to explain why at this point there is not enough information to even consider setting limits for non-thermal effects, because the mechanism is not known, and therefore we don't know how the effect scales. It may not scale at all with respect to the intensity of the exposure.

From my point of view, and from my knowledge in this area, if there are questions, I'd like to respond to the Royal Society review with respect to section 6.5, which deals with magnetic resonance imaging; section 7.8, which deals with low-level and non-thermal effects; section 7.9, which is about possible effects on stress protein expression; and section 10.2, the last bullets only, which are the summary of the recommendations that I have already referenced. Of course, I would be willing to answer questions in terms of what research still needs to be done for "non-thermal effects."

That's my statement.

● (1550)

The Chair: Thank you very much.

Next up we have Dr. Paul Demers. Go ahead, sir.

Dr. Paul Demers (Director, Occupational Cancer Research Centre, Cancer Care Ontario, As an Individual): Thank you, Mr. Chair and members of the committee, for inviting me here today. I know I've been asked to come here today because I chaired the expert panel of the Royal Society of Canada on Safety Code 6. But I thought I'd start by saying a few other things about my background.

I'm the director of the Occupational Cancer Research Centre, which is based in Cancer Care Ontario, a provincial agency that is also funded by the Ontario Ministry of Labour and the Canadian Cancer Society. I'm also a member of the faculty of the schools of public health of the University of Toronto and the University of British Columbia.

I am an epidemiologist, so I study impacts of different types of health effects upon populations of people, but my primary area of research is on the risk of cancer associated with workplace chemicals, dust, and radiation, although I have done research on a number of other diseases as well as on environmental exposures. However, I want to state that, unlike Dr. Prato, I'm not an expert specifically in the area of electromagnetic fields and have never actually done research on radio frequency radiation.

As you know, at the request of Health Canada the Royal Society convened an extra panel to conduct a review of the 2013 draft of Safety Code 6. I was asked to chair that panel because I had no conflicts of interest and because of my expertise in cancer epidemiology, which was identified as one of the areas for which they wanted expertise on the panel.

I was also asked because of my experience sitting on similar panels for the International Agency for Research on Cancer, the U.S. national toxicology program, the U.S. Institute of Medicine, which is part of the National Academy of Sciences, and the Council of Canadian Academies, the latter two being fairly similar to the Royal Society of Canada in the way they operate.

I should also mention, although you may be aware of this already, that I was the second chair of the panel. The first panel resigned because of a perceived conflict of interest, and I took over as chair of the panel about midway through. But I also want to state that I'm here as individual and am not representing the Royal Society of Canada or any other organization at this point.

The panel was presented with five specific questions, and I'm going to over very briefly our responses to those five questions. Overall, they were all dealing with whether or not there were any established health effects at levels below those recommended by Safety Code 6 and related types of questions.

To answer these questions, we did a review of recently published studies in the area on a wide range of different types of health effects. We also looked at many of the international reviews, which I think have already been mentioned here today. These are conducted on a pretty regular basis by many agencies around the world.

Because we were asked to look in particular at established health effects, we defined an established adverse health effect as something that has been seen consistently or been observed consistently in multiple studies with a strong methodology. So we had a fairly flexible definition, but still it required an effect's being observed in not just a single study.

Before I get into the questions—because I'm actually going to read out the questions we were given—I want to explain two different terms that are used quite a bit in those questions, namely the definition of what basic restrictions are and what reference levels are.

Basic restrictions in Safety Code 6 are things that happen within the body, either heating or induced fields within the bodies, or things like those. Many of the actual limits are set based upon that. Because these are not easily measured, the code also uses reference levels, which are things you can measure outside of the body using a meter. They are much easier for regulatory purposes. You will often see that the questions are phrased in terms of these basic restrictions and reference levels.

● (1555)

Our first question was, do the basic restrictions specified in Safety Code 6 provide adequate protection for both workers and the general population from established adverse health effects of radio frequency fields? Our conclusion was that yes, they provided that protection. Specifically, Safety Code 6 was designed to protect against two kinds of established health effects, thermal effects and peripheral nerve stimulation. The margins of safety, we concluded, appeared to be quite protective. For peripheral nerve stimulation, it was a safety factor of five for the workplace or controlled environments, and a 10-fold factor for uncontrolled environments, which are closer to what you would experience in the general public. For thermal effects, the safety factor was 10-fold for workplaces and 50-fold for the general public.

The second question that we were given was, are there any other established adverse health effects occurring at exposure levels below the basic restrictions on Safety Code 6 that should be considered in revising the code? Our conclusion to that question was no. The panel reviewed the evidence for a wide variety of health effects, including cancer, cognitive and neurologic effects, male and female reproductive effects, development effects, cardiac function, heart rate variability, electromagnetic hypersensitivity, and adverse effects in susceptible areas of the eye. Although research in many of these areas—important research, I think—continues, we were unable to identify any adverse health effects occurring at levels below those allowed by Safety Code 6.

Our third question related specifically to the eye: Is there sufficient scientific evidence upon which to establish separate basic restrictions or recommendations for the eye? We concluded that no there wasn't sufficient evidence. Recent studies do not show adverse health effects in susceptible regions of the eye at exposure levels below those proposed by Safety Code 6 for the head, neck, and trunk. Therefore we recommended that it not contain separate basic restrictions for the eye.

The fourth question was perhaps a bit more complex: Do the reference levels established in Safety Code 6 provide adequate protection against exceeding the basic restrictions? That is, do the levels that are proposed as limits for things you can measure outside the body actually protect against the target health effects the code is trying to prevent within the body? Our conclusion was that for most frequencies, yes, reference levels were adequate, but that there were some regions where compliance with the reference levels may not ensure compliance with the basic restrictions. We recommended that the proposed reference levels in Safety Code 6 be reviewed by Health Canada to make them somewhat more restrictive in some frequency ranges to ensure a larger safety margin for Canadians, including newborn infants and children.

This recommendation took into account recent studies that we call dosimetry studies, at least one of which was published after Health Canada produced the proposed Safety Code 6.

Our fifth question was, should additional precautionary measures be introduced into Safety Code 6 exposure limits? I'll state that although there was a range of opinions on the panel regarding precautionary efforts, overall the panel believed that Safety Code 6 was well-designed to avoid established health effects; we did not have any science-based recommendations for precautionary measures to lower the limits. I'll say that it was for the reasons that I think Dr. Prato explained quite well, which is that we couldn't, at least in looking at the study, say that the evidence tells us that we should lower it it in such a fashion. However, we did recommend a number of other measures that can and should be taken by Health Canada.

I'll read some of them here now.

● (1600)

First was to investigate the problems of individuals with what's called electromagnetic hypersensitivity—it goes by other names as well, IEI-EMF, and things like that—with the aim of understanding their health conditions and finding ways to provide effective treatment.

Second was to develop a procedure for the public to report suspected disease clusters and a protocol for investigating them.

Third was to expand Health Canada's risk communication strategy to address consumer needs for more information around radio frequency radiation.

Fourth was to identify additional practical measures that Canadians can take to reduce their own exposure.

These recommendations are really in response to the public input that we received as part of the panel. We also had a number of different research recommendations. In particular, if one has the chance to read the report, you'll notice that each section on a particular health effect usually ends by basically pointing out that more research is needed on that health effect.

A few of the specific ones are that Health Canada should aggressively pursue research aimed at clarifying the radio frequency radiation cancer issue, which would allow the government to develop protective measures if the risk were substantiated; and that Health Canada should pursue research to expand our current understanding of possible adverse health effects of exposure to radio frequency radiation at levels below those allowed by Safety Code 6.

The response to the panel's report from Health Canada—

● (1605)

The Chair: Mr. Demers, I'm sorry to interrupt you. We are tight for time today, so if you could wrap it up here in the next little bit, that would be great.

Dr. Paul Demers: I have about two sentences left. Thank you very much.

The response to the panel's report from Health Canada, which is publicly available on the web, is that it would review all the panel's recommendations and would revise the levels in the update to Safety Code 6, which has now been adapted. I am personally not an expert in the measurement of electromagnetic fields, as I mentioned, but Health Canada has reported that our feedback was incorporated. In looking at the new Safety Code 6, you can actually see that changes were made in the frequencies that we had recommended be lowered.

With that, I'll end. I'm sorry if I went over time.

The Chair: That's great. Thank you very much.

The first round of questioning will be *en français*, so if you need translation, you can use the earpiece and set it to English. We'll do a test run before we start Ms. Moore's time.

Go ahead, Ms. Moore.

[*Translation*]

Ms. Christine Moore (Abitibi—Témiscamingue, NDP): Thank you, Mr. Chair.

In December 2010, the Standing Committee on Health published a report entitled “An Examination of the Potential Health Impacts of Radiofrequency Electromagnetic Radiation”. Allow me to summarize the five recommendations I'm interested in.

The first recommendation was to provide funding to the Canadian Institutes of Health Research for studies into this matter.

The second was to conduct an assessment of scientific literature.

The third called for a comprehensive risk awareness program for exposure to electromagnetic radiation.

The fourth involved providing information, including awareness sessions.

The fifth recommendation was to implement a process to receive reports of adverse reactions.

As we know, the government did not respond to that report because of the 2011 federal election. I would like to know which of those five recommendations submitted by the committee over four years ago have been followed, why some of them may not have been implemented, and to what extent certain recommendations were followed.

I would also like to know what the next steps are.

Mr. Andrew Adams: Thank you.

Health Canada did receive the committee's recommendations in 2010. I can give you an overview of what we have done in response to the recommendations.

It could take some time, as there are five recommendations.

The Health Canada website provides some information on the effects of electromagnetic fields and on what Canadians can do to protect themselves. We have information on cellphones and on how Canadians can reduce their exposure to those devices. We also have information on Safety Code 6, as well as on its development and measures to protect the health of Canadians.

I think we have submitted to the committee a list of documents available on the Health Canada website. I should have a copy of it. Perhaps I should be asking you whether you have received the list. I think we have given you documents from the Health Canada website.

● (1610)

Ms. Christine Moore: We did receive those documents.

Mr. Andrew Adams: In response to the committee's recommendation from 2010 that we raise public awareness, we have posted information on the department's website.

Do you have more specific questions about that?

Ms. Christine Moore: If I understand correctly, only people who look for the information on your website will be educated. There are no awareness programs for the general population—for instance, warning young people against carrying their cellphones in their pockets, directly against their skin.

Mr. Andrew Adams: We don't have anything like those television advertisements on drug use.

Ms. Christine Moore: Okay.

Mr. Andrew Adams: We don't have any programs to educate young people and families about the effects of electromagnetic fields, for instance.

Ms. Christine Moore: Regarding complaints, is there a place where people who think they are having an adverse reaction to radiofrequencies or health care professionals who think their patients may be having those issues could report their experience?

Mr. Andrew Adams: We already have a consumer product safety system.

We can receive complaints about any consumer products, including cellphones, through that system. When people have problems related to cellphones or to electromagnetic fields created by cellphones, they can use that existing service.

Ms. Christine Moore: Okay.

Is the industry looking specifically into the cumulative effects of radiofrequencies emitted by several devices together? For instance, a home will often have a cordless telephone, two or three cellphones, a baby monitor, a smart meter, a Wi-Fi router, and so on.

Mr. Andrew Adams: Yes.

Ms. Christine Moore: Are specific studies also done on pulsed waves, as in the case of smart meters, which emit waves every 60 seconds? Those are more aggressive effects compared with continuous background noise. It's sort of like water torture.

Mr. Andrew Adams: Yes, I understand.

Ms. Christine Moore: Are any studies focusing specifically on pulsed waves?

Mr. Andrew Adams: I do not know whether specific studies are being carried out on pulsed waves. I don't know if my colleagues have more information.

Ms. Christine Moore: What about cumulative effects?

Mr. Andrew Adams: As you said, a home has a number of radiofrequency sources—Wi-Fi networks, cellphones and several other devices. The limits established in Safety Code 6 apply to all sources of radiation. So all devices must respect the Safety Code 6 limits. However, I'm not sure if any studies have been carried out to determine the electromagnetic field level in a home with several sources.

[*English*]

The Chair: Thank you very much. We have to keep tight time here for questioning.

Ms. McLeod, go ahead.

Mrs. Cathy McLeod (Kamloops—Thompson—Cariboo, CPC): Thank you, Mr. Chair. Thanks to the witnesses.

I think I'm the only one who was here for the original report that we did, and I haven't been on the health committee since. I'm glad to see that even though Parliament dissolved, there was some process that continued.

I would like to ask that we ensure that the review of Safety Code 6 by the Royal Society be tabled as part of our study. I think it was a really critical piece of what we asked out of the last committee. If it has not been tabled already, we can perhaps incorporate it as part of this review.

There are a few areas. Obviously, at this point in time, you talked about what was a very robust process in terms of the research that you included and didn't include. I keep going back. I remember, for example, when—perhaps it was a couple of years ago—Dr. Zamboni's procedure for MS provided hope for patients and there was some research that indicated it might be helpful. But when we actually put in a proper process for evaluating the research, unfortunately it sounds as though to this day it is not something that is actually effective.

Having said that, this research is going to continue to emerge and evolve. Is the World Health Organization doing a massive review right now? Is that accurate?

● (1615)

Mr. Andrew Adams: Perhaps I can ask Dr. McNamee to respond to that. Dr. McNamee has worked with the World Health Organization and is certainly up to date on the work they're undertaking.

Mr. James McNamee (Chief, Health Effects and Assessments Division, Healthy Environments and Consumer Safety Branch, Department of Health): Yes. For the past several years—at least two years now—there has been an ongoing effort to assemble a risk assessment at an international level through the WHO's international EMF project. This process is basically a systematic review, wherein all studies are identified. They are assessed for quality according to a variety of required measures; the studies are summarized; and there is a statement of their strengths and weaknesses. Some studies that have very poor methodologies or quality are included in the analysis but are removed from the final decision matrix. But they are actually documented, so that there is a very clear, transparent accountability over which studies have been looked at, which studies have been included for risk analysis, and which studies have been excluded based on quality.

A draft version of that document was posted on the WHO website, I believe in December 2014. The public consultation was, I think, originally for 30 days, but it was extended to 60 days. I believe that period has now ended. The intent is to publish that risk analysis document by 2016.

Mrs. Cathy McLeod: Is it accurate to say that to date, from the evidence you have reviewed and what seems to be emerging out of the review being done by the WHO, our standards under Safety Code 6 are congruent with what the current research and literature indicate?

Mr. James McNamee: Yes. The reviews by international health agencies and NGOs have been quite consistent in their conclusions of an absence of adverse health effects below the exposure limits, in standards such as ICNIRP, which is applied throughout Europe and in about 100 countries. In fact, Safety Code 6 is now more restrictive than the ICNIRP standard in most frequency bands.

Mrs. Cathy McLeod: As I go through the list it's interesting because, of course, we have some people who express concerns. But I also have people who are regularly asking for cellphone towers and coverage of all sorts, so I think there is this real dilemma in the population and what really are tools of living now.

I see that in Switzerland they have this really low rate. First of all, perhaps you could speak quickly about the dynamics of it. Second—and maybe to Industry Canada—do they possibly achieve those limits, and if they do, then is Canada's exposure really down that low?

Could people speak to that, please?

Mr. James McNamee: Perhaps I'll start.

A couple of other states or cities, such as City of Toronto in this case, have a policy that requires emissions from cellphone towers to be perhaps 100 times below the national limits, such as Safety Code 6, or ICNIRP, for that matter. While Switzerland's basis is on ICNIRP, for public exposure from cell towers or other infrastructure, they require it to be 100 times below that science-based limit.

That's a public policy approach that has been taken by these governments. It's not necessarily applied to other wireless devices, such as Wi-Fi routers, smart meters, or cellphones, so it's very targeted at a very specific type of technology that is unpopular at times.

I think it's very important to make the distinction that this is a very specific action taken for a specific type of installation.

● (1620)

Mrs. Cathy McLeod: And Industry Canada....

Mr. Peter Hill (Director General, Spectrum Management Operations Branch, Department of Industry): Hello. My name is Peter Hill. I'm with Industry Canada, the regulator of cellphone sites, etc.

I can tell you, based on our experience over decades, that the grand majority of cellphone towers are hundreds, or thousands, or tens of thousands of times below Safety Code 6 limits already. In fact, the change to Safety Code 6 had no impact on the power levels associated with those.

The exposure that we do from a regulatory perspective is the cumulative effect, to answer the earlier question. It is all cumulative, so if there are five cellphone towers in a particular area, regulatory compliance is brought about by the cumulative effect. We verify that on a regular basis around the country.

As I said, very few sites even come within 50% of Safety Code 6, and the ones that get closer are high-power broadcast sites that are generally located far away from where people live. The issue is proximity and power levels at these kinds of locations.

At the end of the day, most sites in Canada are thousands of times below Safety Code 6 already.

The Chair: Ms. Fry, go ahead.

Hon. Hedy Fry (Vancouver Centre, Lib.): Thank you very much.

I want to thank you for coming here to let us discuss and listen to something that is going to be more and more important. As a politician, I can tell you that it is something I'm hearing from my constituents a lot. So the ability to shed some light and to look at some good public policy on this, I think, is really important at this time.

I want to ask a couple of question. For instance, I noted that the panel didn't do a comparative, in-depth analysis of new literature. I understand that the panel felt they weren't asked to do that. Did the panel do an extensive, comparative review of recent literature?

Dr. Paul Demers: Yes, we did look at recent literature.

Hon. Hedy Fry: Was it a really broad overview? Did you review a lot?

Dr. Paul Demers: Yes, with each of the targeted potential adverse health effect areas, we tried to look at papers that were published on those specific areas in the years where there was, for instance, a good comprehensive review available. For cancer, which is my area, we looked at the International Agency for Research on Cancer's evaluation, and then we tried to identify papers that were published since that time, and then looked at the entire body of research that was done. That was indeed what we did.

Hon. Hedy Fry: If there is no database that looks at clusters of new diseases, new cancers, etc., in people who have had extensive cellphone usage, and that is age-related and based on frequency of use, and of course the cumulative effect.... Especially in children, how do you gauge the cumulative effect when it is only in the last three or four years that we have seen people exposing their kids as young as two or three years old to cellphone use, etc. Now, there is obviously no study done on the longitudinal effects of cumulative use, etc., because these kids are still little.

Do you not feel that it is important to have some kind of database that looks at clusters, that is reporting clusters, or that physicians may be asked to look at any kind of possible cause and effect on new cancers among people based on the frequency of their cellphone use, the cumulative effect, and age-related use? Has that been done? Has Health Canada tried to set up such a database or reporting system of some kind?

Mr. Andrew Adams: I would note first of all that health care is a shared responsibility, as the members know. Actual health care delivery and treatment dealing with people who have cancer largely falls to the provinces. Certainly both levels of government can legislate when it comes to health, but when it comes to what the provinces are doing as far as cancer epidemiology is concerned, I can't comment. From Health Canada's perspective, I'm not aware of databases that Health Canada has established to look at cancers and perhaps clusters, but I think there is a question of jurisdiction here that would have to be considered as well.

● (1625)

Hon. Hedy Fry: With due respect, I disagree with you. I think when you look at drugs and look at setting up drug reporting systems, Health Canada does that. This is a federal responsibility, to collect information across the country on data that is coming out on drug use, the adverse effects of the use of drugs, etc.

Since it is the Government of Canada that okays and sets up the whole safety code and the use of cellphones, the setting up of cell towers, etc., I would think it incumbent upon the federal government to collect that kind of data, because as we well know, this is a very large country, and very different provinces have very different usage in numbers of cell towers, etc. I would think this is a real role for the federal government, and I wonder why, if one could do it on the adverse effect of drugs, one couldn't do it on the adverse effect of the use of certain technologies.

I think it's a real question. The federal government is responsible for all Canadians; the provinces are only responsible for their provinces. If we're looking at safety and health—because we are looking at the interaction between safety and health—it would seem to me to be like falling off a log if we didn't do this very important, and common sense, thing to want to do.

Mr. Andrew Adams: I think that what you're suggesting would be fairly complex to implement. I understand the reporting of adverse events associated with drugs to the federal government, and I think it makes sense when the federal government is approving these drug products.

I'm not a physician and so can't comment from a strong knowledge base, but there are many types of cancers. How would they be associated with a particular cause?

I think there are many details associated with what you're suggesting that would make it a very complicated proposal to implement, but it's certainly an interesting suggestion.

Hon. Hedy Fry: I would say that it in fact is no more complex than looking at the causative effect between smoking and cancers, which has obviously a history, taken by doctors and by smoking and eventually finding out the relationship. It is something that again is what we do with epidemiology. Epidemiology should be looking at some of these relationships.

I just think it is important for us to start ensuring that we keep a watching brief on what is going on with new technologies and monitor where the causative relationship is. We did it with cigarettes; we found it out with a lot of things that we did not know of before; and we now find cause and effect with lots of usage or lack of usage of certain foods, etc. This is a normal part of finding a way, to collect good data based on clinical medicine and outcomes and disease. That's what epidemiology is, disease clusters. Why are they there? How are they there? What are the causative effects?

If an epidemiological basis exists for looking at these new technologies, which are being used so frequently now, it is really important for us to keep a tab on them. I know that everyone thinks the precautionary principle is a joke, but it isn't. If we had observed the precautionary principle a long time ago, we could have prevented many of the diseases we now have that are very rampant.

I'm not saying that the precautionary principle should stop progress or stop the use of technology, but there needs to be some kind of data, some kind of watching brief done by the federal government on the way the country and various regions...and one may find a causative relationship between why things happen in region A and don't happen in region B that have the same frequency or duration.

I think this is an important part of new epidemiology. It's no longer that we're looking at cause and effect of the disease, of viruses, of bacteria; we now have to look at new kinds of things, such as technology and what its impact—

The Chair: Excuse me, Ms. Fry.

Hon. Hedy Fry: And did you not ask for that, Mr. Demers? I thought you guys asked for that research.

The Chair: Excuse me, Ms. Fry. I'm sorry, we're over time.

Mr. Andrew Adams: Mr. Chair, may I just respond?

The Chair: Do so very briefly, sir.

Mr. Andrew Adams: I would just like to mention that we realize that the WHO's IARC has classed RF as a possible human carcinogen. Health Canada certainly is monitoring the scientific literature when it comes to what is going on with cancer and RF fields and will continue to do so. If there were some indication that the link is strong—at the moment there is some indication that there is something, but I think it needs a lot more research, as the Royal Society suggested....

I would also like to mention that we are already doing cancer surveillance in the Public Health Agency of Canada and the Canadian Partnership Against Cancer. So the portfolio already is part of overall cancer surveillance.

● (1630)

The Chair: Thank you, sir.

Mr. Young, go ahead, sir.

Mr. Terence Young (Oakville, CPC): Thank you, Chair, and welcome, everyone.

Mr. Adams, this chart was modified, revised from a chart from the British Columbia Centre for Disease Control.

Mr. Andrew Adams: May I ask what chart you're referring to, please?

Mr. Terence Young: It's a chart of radio frequency exposure limits in different countries.

Mr. Andrew Adams: Okay.

Mr. Terence Young: Were China and Italy removed from this chart?

Mr. Andrew Adams: I can't comment on that.

Mr. Terence Young: I'll tell you why I ask. The two at the bottom are the lowest levels. They are Russia and Switzerland. China and Italy also have extremely low levels. Had they been included, it would have told a significantly different story. In fact, that's 1.2 billion people who are covered by very low levels, well below the levels in Safety Code 6. I was a little disappointed by that.

I want to ask you, on record, why you expect the Canadian public to just take your word for it that you looked at 140 studies presented by a national group based in my riding of Oakville.

"Just trust us. We looked at them."

Why can't you practise the scientific method and put together a report that says, "We reject this study because it was the wrong frequency. We reject this one because it wasn't repeatable," or some such thing? That's the scientific method.

Why don't you have enough respect for Canadians to show them why you reject the studies or why you accept them. What is your methodology?

Mr. Andrew Adams: I can assure you, as I did during my opening remarks, that we did look at the 140 studies. Most of those studies had already been looked at when the safety code was updated, but—

Mr. Terence Young: No, I'm just asking you specifically why you don't just publish your thoughts. You looked at the studies. Somebody could put together a paragraph on each one saying why it was accepted or rejected

Let me just leave you with that question, because I'm going to try to get three questions in.

Mr. Andrew Adams: Okay. It was my understanding that we've already provided a summary of—

Mr. Terence Young: I'm not talking about a summary, I'm talking about a scientific monograph. I know you haven't done it and I'll just leave you with that thought.

In 2010, your director general, Beth Pieterson, testified before this committee—and it must have been very important because it was her primary evidence—and here's what she stated:

> To our knowledge, there is no major jurisdiction in the world that has banned Wi-Fi from schools based on scientific evidence available.

Since that time, France has banned Wi-Fi in daycare centres and nurseries; Taiwan has banned children under two from using radio frequency devices, cellphones; Belgium has banned sales of mobile phones to children under seven, and banned advertising to children; Israel has banned Wi-Fi in schools if there is an EHS sufferer present, and they are testing levels of electromagnetic radiation in every school. By the way, the total population of these countries is 108 million, so that's pretty major.

Doesn't that make you rethink everything you've said thus far? If it were that important back in 2010 when no other countries had done anything, doesn't it make you want to rethink everything you've said thus far on Safety Code 6, now that they have?

Mr. Andrew Adams: Not at all. I have confidence in Safety Code 6 and in how we've developed it. I think it is a solid piece of work. I think that's been confirmed by the Royal Society of Canada's review. I think the fact that it is consistent with the WHO and other international reviews just supports that all the more.

Mr. Terence Young: Thank you very much.

I read your Safety Code 6. I've read all those documents, all the links you showed, and I read the latest one. I read about nerve stimulation, excitable tissue, dosimetry, and I read quotes such as that the evidence does "...not provide a credible foundation for making science-based recommendations...".

Frankly, it doesn't tell me what I need to know and it doesn't tell me what my constituents need to know. No evidence of harm does not mean safe. That's the industry line. They always say there's no evidence of harm. They just repeat it ad nauseam. But it's not their job to keep Canadians safe; it's your job.

Mr. Andrew Adams: And we're doing it.

Mr. Terence Young: Here's what I need to know. Please tell me.

This is a question posed to me by one of my constituents that I repeat to you because I need the answer. The constituent said, please tell me in plain language, can you assure me that it's safe to put my cellular phone to my head for an hour a day? I want to know how many hours it's safe to do that for. Can you tell me it's safe to have a baby monitor a few feet away from my two-year-old granddaughter's head for eight hours a night? Can you tell me it's safe for my daughter to carry in her bra year after year? Will it harm her? Can you tell me, is it safe for kindergarten children to have powerful Wi-Fi antennas five feet over their heads for eight hours a day, or should we simply put jacks into schools and take Wi-Fi out of the schools, as other countries have done; as France has done?

I'd like to know if anybody who's spoken thus far in support of Safety Code 6, as it exists, wants to put their reputation on the line and tell me that all those uses are safe, and that those people will never come to harm from cellphone radiation or electromagnetic radiation.

● (1635)

Mr. Andrew Adams: I think what I'm confident in saying is that if people use devices according to the manufacturers' instructions—and there are instructions about keeping cellphones a certain distance from the body and things such as that—

Mr. Terence Young: It's 25 millimetres.

Mr. Andrew Adams: If people follow manufacturers' instructions and those devices respect the limits in Safety Code 6, I'm confident that they do not represent a risk to Canadians.

Mr. Terence Young: Despite everything—despite the study done in Sweden, the Lawson study, which showed a four-times increase in the chances of getting brain cancer on the side of the head you use your cellphone on for long-term continuous use—do you think it would be safe? Or do you think they're all wrong and that their studies are useless and not worth paying attention to?

Mr. Andrew Adams: I cannot comment on that study, because I have not studied it. I'm not a scientist. I'm not familiar with that study and I cannot comment on it.

Mr. Terence Young: Maybe Mr. McNamee wants to comment.

Mr. James McNamee: Which study were you referring to, sir?

Mr. Terence Young: I think it's called the Lawson study, a study out of.... Maybe I have the wrong one. It was a study done out of Sweden. There has been more than one showing increased risk of brain cancer—glioma—and of the auditory nerve on the side of the head on which people use cellphones, after long-term use.

Mr. James McNamee: The International Agency for Research on Cancer in 2010 and 2011 did a study on this. I was actually a member of that panel. We looked at all of the data. There were epidemiologists, there were medical doctors, there were people who specialized in animal studies and in vitro studies looking at all the various lines of evidence to determine the scientific basis for a potential cancer risk with RF fields.

Mr. Terence Young: Thanks. I'd like to try to get one more question in. I know where you're heading with this. I appreciate it. Thank you.

We know that EMR can enter a human brain to a depth from four to five centimetres, and of course a child's head is only 10 centimetres when they're very young, so the EMR is going right through their head. If there is a baby monitor next to their bed, it's at the same frequency or close to the same frequency as a microwave oven for maybe eight hours a night.

Have you ever done any studies that demonstrate that this is harmless to infants? Have you ever done any studies, or do you know of any?

Mr. James McNamee: I think it's important to point out that you can never prove that something is safe or that something will never happen. We're subject to the evidence base we have at this time. The IARC committee looked at that evidence. Basically, there were studies that found effects and studies that didn't find effects. Many animal and in vitro studies were looked at. Based on this examination, they made a recommendation that it be classified 2B, as possibly carcinogenic to humans. That recommendation acknowledged that there was some credible evidence suggesting that there might be a risk in the long term, but that it was impossible to make a causal association at this time.

Mr. Terence Young: Okay. So what standard of proof are you using?

The Chair: Mr. Young, you're well over time.

Ms. Sellah, we have time for a brief question.

Mrs. Djaouida Sellah (Saint-Bruno—Saint-Hubert, NDP): Okay, I have a brief question.

[*Translation*]

I would first like to thank the witnesses for coming here to shed some light on this issue, which I assume will never be resolved with the way things are going.

I am puzzled by the table I am looking at. It provides the radiofrequency exposure limits in different countries. I know that Health Canada has made some efforts from 2009 to 2015, but let's compare our data with Russia's, a large country like ours. For example, how do you explain that, for a frequency of 900 MHz, the threshold is 0.10 W/m^2 in Russia, but it is 2.7 W/m^2 in Canada? Could you give us more information on that data?

Mr. Andrew Adams: I think it is difficult to explain why other countries have set such low thresholds. However, as previously mentioned, we think that those thresholds are not scientifically justified. Moreover, as it was also mentioned, the limits in some cases apply to a single cellphone tower. They generally don't apply to all radiofrequency-emitting infrastructure. So it is really difficult to explain other countries' data, but we are confident that the thresholds established in Safety Code 6 are adequate.

● (1640)

[*English*]

The Chair: Thank you.

I have a point of order from Mr. Lizon.

Mr. Wladyslaw Lizon (Mississauga East—Cooksville, CPC): Mr. Chair, while you release the panel, I would ask whether Mr. Adams could provide to the committee the information that Mr. Young was asking for, that is, on what basis were the 140 studies, or all of the studies, accepted or rejected.

I think the committee has the right to know on what basis that work was done and how it was done. If they can provide it in written form, we would probably need it for the study.

The Chair: Thank you.

It's 4:40, and we're going to suspend. We're going to come back. We're going to excuse these guests and bring some new ones in, and then we'll start back up.

● (1640)

(Pause)

● (1640)

The Chair: We're back in session. We are tight for time, so we want to make sure we give everybody a fair chance.

We have two guests appearing in the second portion of our meeting, Dr. Meg Sears and Professor Martin Blank.

They each have prepared statements as far as I know, so we'll have Dr. Sears go first, and then Professor Blank can go after.

Go ahead.

Dr. Meg Sears (Adjunct Investigator, Children's Hospital of Eastern Ontario Research Institute, As an Individual): Thank you very much, Mr. Chairman and members of the panel. I'm very grateful for this opportunity today.

I apologize for not providing bilingual materials, but I received my invitation just a week ago, so the timing didn't work out to take advantage of your translation services.

My name is Margaret Sears. I am here as someone with some knowledge on the subject matter—a very limited knowledge on the subject matter—but more importantly, as a scientist interested in environmental health as well as methodology in this field.

I am inspired by working with Dr. David Moher's research group here in Ottawa at the Ottawa Hospital. He is among the world's premier methodologists in clinical epidemiology, a highly respected and influential scientist. I also work in environmental health, was funded as a principal investigator for a Canadian Institutes of Health Research project. I'm associated with research institutes at both CHEO and the Ottawa Hospital, and have worked with Canadian medical specialists in environmental health preparing reports for the Canadian Human Rights Commission, the Canadian Transportation Authority, the Alberta Energy Regulator, and others. I have been a guest editor for peer-reviewed medical journals and have co-authored several systematic reviews. That's enough about me.

Regarding Safety Code 6, I made submissions to the Royal Society of Canada and to Health Canada, and Dr. Moher and I also attended a meeting on September 19 with Mr. Adams, Dr. McNamee, and Ms. Bellier.

I also recently responded to the World Health Organization during consultations on their review of health effects of radio frequency radiation. I'll briefly answer one of the questions about that. That consultation document is only partially done. There were no conclusions associated with it, and according to the method section, the literature search ended in 2011, so it's far from complete. So it is nothing that we could be basing anything on at this stage. And it also had no tables of evidence or anything like that in it.

In short, I see major problems with the reporting of these studies, which should reflect on the execution of these reviews. If a review is not well conducted, it is subject to bias and incorrect conclusions.

Last year, the prominent medical journal, *The Lancet*, published a series of articles on waste in research that was not adequately conducted or reported. It is a big problem, wasting a lot of money on badly conducted and badly reported research.

You have been provided a paper by Rooney et al describing the most recent methodology for systematic reviews in environmental health. The reviews of health and frequencies covered by Safety Code 6 that I have examined, including many of the authoritative reviews relied upon by Health Canada, are lacking salient features of systematic reviews, as summarized in the chart you have been provided. They have also captured but a fraction of the literature, according to what's referenced, with organizations referring to the validity of one another's reviews.

On the other hand, I have a sample of one of the systematic reviews that I co-authored. It's on the relatively narrow topic of dietary supplements and cardiovascular drugs. This is a concern for a much smaller segment of the population than radio frequency radiation that we're all exposed to, but we started from scratch because there was no good review to base it upon, and initially we screened over 33,000 records. There are methods and software established to handle this kind of volume of literature. In a 2012 presentation, it was stated by Pascale Bellier that Health Canada has reviewed 50 years of research. Canadians are waiting to see this evidence because it is not evident to date.

Systematic reviews address specific questions, not really general questions so much, so you have to parse your question to be able to tackle it with really good methodology. They are collaborative. They're transparent. Certainly these processes with Health Canada leave a lot to be desired. Systematic reviews address ingrained biases.

● (1645)

You can only build upon previous reviews that are of high quality. Without previous high-quality reviews to build upon, we have to go back to that 50 years of data. What we have currently is a bit like that telephone game in which messages get mixed up as they're half-heard while they are whispered to one another around the table.

I also believe that there's good reason for concern in this field. Safety Code 6 is said to protect against “established” health effects. What does it take to establish a health effect? Sometimes that hurdle is very high, and there's a somewhat arbitrary bar, because people are.... We'll talk about that in a minute, but keep in mind that every time you hear “established health effects”, there is the question, what does it take to establish a health effect?

I'll give you a couple of examples of research. In the slides that were distributed to you, there is a table with cancer studies. The clearest research originates from Hardell's group in Sweden, comparing phone use between people who had brain tumours and healthy individuals; this is called a case-control study. In Sweden, the background rate of glioma is, I believe, lower than in Canada. We do not properly capture details of brain tumour incidence in Canada, although a database is being set up.

Higher risks, up to fourfold increases, were seen in Sweden with use of wireless phones, both cellphones and cordless phones. The risk of a tumour on the side of the head the phone was held against increases when use begins earlier in life, so children and adolescents are at greater risk, with longer cumulative time on the phone and more years of use. But only part of this information was referenced by the Royal Society of Canada.

The Interphone Study was referenced. This was an enormous study extending over 13 countries, and the diversity of health status and co-exposures really muddied the waters in this study. For example, in some countries, having a phone was a symbol of wealth and was associated with a healthier diet and a cleaner environment. Initial analyses showed that cellphones protect you from cancer, which even the author said was a completely implausible effect, and it was because of this confounding. Further analysis did show higher tumour incidence with phone use.

These two human studies were key in the IARC determination that cellphones possibly cause cancer. But since then, the French CERENAT study was published in 2014. It was not referenced in any of the documents from Health Canada or the Royal Society. It is similar to the Hardell studies. When the analyses were performed in the same manner, the results were basically replicated. So now we have that replication, and such replication is key to becoming an established health effect.

Another concern relating to cancer is women who carry their phones in their bras. Phones are sending signals constantly to keep in touch with a network, even when you're not talking. The first case was reported in 2009, in a keen cell phone user who stored her phone in her bra for 10 years. Cases are piling up of characteristic tumours in young women with no known genetic predisposition. This information also was not taken into account, as far as we know. Maybe it was, but it was certainly not documented that it was taken into account.

Now, if women carry phones in their bras, men carry a lot of phones in their pockets. In Canada, we have some problem with infertility. This is one of many studies showing effects on sperm—there is a graph in your handout. When exposed to typical radiation from phones in pockets, sperm stop swimming, their DNA is damaged, and they die.

What we see in people is backed up by much other research into cells and animals. A lot of the recent research demonstrating potential harm was omitted from reports that supported Safety Code 6, as was discussed previously.

I should say that in the comments regarding the ability to assign a dose to an exposure, what happens in this research is that, if animals are merely exposed to a phone.... With a phone, it's hard to say that the exposure is precisely such and such a number, but it's status quo. But these status quo phone exposure studies are discarded. There's a huge body of evidence that is discarded just because they used a phone instead of something that was more “scientific”.

● (1650)

In summary, I'd offer three recommendations.

First, Health Canada must systematically access, assess, and act upon all the science from scratch. It needs specific tools as well as methodological and library expertise to accomplish this.

Second, we have to open our eyes and collect this environmental health data, both exposures and health outcomes. On that, I would note that the regular compliance data that Industry Canada is accumulating should be made public, so that if a doctor is concerned, he has that data to connect the dots.

We also have to be collecting really good, detailed cancer incidence data. We used to collect that, but it's not available any more. The Public Health Agency of Canada has some data on their website. It used to be reported in small areas, but now it's only reported at the provincial level.

● (1655)

The Chair: Dr. Sears, we're over time. Could you just summarize, please?

Dr. Meg Sears: Okay.

There is rapidly escalating exposure. I don't think we can really wait any longer to take good action because the status quo is too much. We should move to minimize exposure while we carry out more research.

Thank you very much.

The Chair: Thank you.

Professor Blank, go ahead.

Professor Martin Blank (Special Lecturer, Department of Physiology and Cellular Biophysics, Columbia University, As an Individual): I must apologize. I thought I would be able to refer to the slides. You have the slides in front of you; I will just mention them as we go along.

Thank you for the invitation. You have my credentials on the first slide. I've been in the research business for a long time in the department of physiology at Columbia University. I've been active in connection with this committee as well.

Basically, my first slide says that Safety Code 6 standards are not protective, with the “not” underlined.

What I'll try and do in the next few minutes is tell you why I think they're not protective.

In a nutshell, they are not measuring the right parameters. If you want to measure something, you have to measure something biological. Measuring the temperature is not a biological measurement, although you can measure the temperature of biological materials. You want to be able to measure biological parameters in order to assess biological function.

In the second slide, I comment on the 140 studies that were omitted. The fact is that these were omitted through an evaluation by non-biologists. For example, there are two studies that were published by Dr. Goodman and me that are referred to very frequently. They reveal the fact that stress proteins are activated by electromagnetic fields. We conducted studies mainly in the ELF range but also in the RF range, both of which were omitted despite having been verified and replicated by others.

In the third slide, I mention the number of biological effects that could be—

Mr. Wladyslaw Lizon: Which slide did you refer to for the studies?

Prof. Martin Blank: I'm on the third slide now, which shows a quote from a paper by two of the authors of the report, Foster and Moulder, who say that the “only unequivocal mechanism for bioeffects” of radio frequency is the “heating of tissue”. This just makes no sense at all to a biologist.

As I said, you can measure the temperature of anything, but it doesn't give you insight into biological function. Yes, a doctor will ask you if you have a temperature to see if you have an infection, for example, but that doesn't give you a clue as to how biological function is going on.

There's a list on that same slide of a number of biological parameters that have been established as being affected by EMF exposure. It includes, if you notice, one about enzyme acceleration.

This is the work we did with some of the very basic enzymes involved in cell function, such as the sodium-potassium ATPase, which set ups the ion gradients that are responsible for nerve function, and cytochrome oxidase, which is the basic reaction that generates the ATP that drives all our cells. These are affected and have been shown to be affected in the ELF range, but I haven't studied them in the other range as well.

All of these basic functions are affected by the EMF.

In the fourth slide, I refer to the cellular stress response. This is a cell reaction to environmental dangers. If you ask a cell if it is in trouble and you measure these stress proteins, you're going to get a yes answer, because the stress proteins are generated when there's trouble. That's not the kind of trouble that we read about in the newspapers, but things like heat shock, which means the temperature is going above and/or below the range. There's a heat part and also a cooling part, and you get a reaction of stress proteins generated by this cell. Changes in osmotic pressure will generate stress proteins, as will acidity, the changes in pH. These are the basic parameters that a cell will react to.

If you look at the next slide about the natural safety mechanism, you'll see that this is the mechanism that I refer to. It protects the body by activating DNA in a particular region. If you look at the sixth slide, the next one with the picture, you'll see that it shows what the DNA looks like. There's a diagram of a chromosome that I pull apart. In other words, you tear it apart and you see what it's actually composed of. Everybody recognizes the end piece, which is the double helix.

The double helix is the stuff that became famous from the Watson and Crick story, but the fact is that this is the stuff that's in all our nuclei. When I went to school I was told that's the stuff that parents pass on to children, and for the rest of the time you had the feeling that it was sitting there doing nothing. But it's active all the time. It's making stuff all the time.

Also, it makes stress proteins when it comes in contact with some dangerous situations. We've actually studied that reaction. We found the particular groups that it reacts with. It reacts with a combination of four particular residues—these are bases—CTCT. That's a particular combination that we found was responsible for the response to heat shock, to a temperature stimulus.

The interesting thing about it is that this particular combination, just on a chance basis, since there are only four of these bases involved in the DNA.... If you look at that slide of the picture, you see that the DNA is two metres long and it has three billion base pairs. In other words, this has many of these things sitting along there. When you're talking about a particular combination of four particular ones, CTCT, you can get that every 250 base pairs, on average. This means that there are many opportunities along that three-billion base-pair array that's sitting there on the DNA. There are many opportunities for interaction.

I have here this picture that shows you the double helix slowly being coiled into a coil, and then a coiled coil, and then a super-coil. In other words, there are many different sizes of coils in the nucleus that's sitting there in that chromosomal structural.

I don't know how many of you will remember this, but way back when television first came in, the antennas used to go up on the roof for reception of TV. TV used to be transmitted in two particular wavelengths. You had two different sizes of wires in there—or metal bars—that would pick up the different frequency ranges. In other words, the antenna functions by reacting to the wavelength of the radiation that's coming at it. That is what's happening with the DNA.

● (1700)

With the fact that you have all these different sizes of loops, you can get reaction like an antenna does. Why does it react like an antenna? It does because for the DNA—in the same picture I have there—where you have the double helix, these two twisted coils with the bonds between them are lined by electrons, which can move. They've been shown to move. There's a whole bunch of papers on this that come from Caltech. Barton has done many studies on that. She's a world-famous scientist and has shown that you can get movement of electrons.

As well, I think the reactions of the DNA with these environmental influences show that it does indeed happen with the different EMF frequencies. Because you have loops of different sizes, you can get reactions of the DNA with different frequencies of radiation.

That's why we ourselves have found interactions in the ELF range and in the RF range. Others have published interactions all along. In other words, these arbitrary boundaries are set by the engineers and physicists who set up that table. They're just arbitrary. When you set up an RF at one point and cut it off at a particular.... Notice that the cut-off is always at a point where the frequency has the number 3 in it, so it's either 300,000 waves per second or 3 million megahertz. The fact is that the set-up was arbitrary, totally arbitrary.

Naturally it's a continuum, so when you look at DNA, you see that it's the continuum also. It's almost as if you can react with almost any part of it that happens to present itself at the surface. I think this is reasoning from the observations. We have found, wherever we have looked at different frequencies and wherever it's been looked at by scientists, that you can get reactions all along.

I think the division between ELF and RF is entirely arbitrary, as you can see by the arguments that are given by the committee itself. The report we are reading actually talks about the fact that they have to understand what's going on in the ELF range in order to explain what occurs at the very low end of the RF part of their range. That's the way DNA responds. It has antenna properties.

In fact, one of the papers we published recently, which was also ignored, was about how DNA is a fractal antenna. That's a technical term and means that it has the capability of responding with frequencies at a very wide range. This is something that you can look up. Technology people are very wise to this kind of thing. It's a very useful thing to have a multi-purpose antenna. In other words, you can pick up a lot of different frequencies.

I would like to move on to the next slide, which is a reference to the research by Professor Alexander Lerchl.

● (1705)

The Chair: We're at 10 minutes now so I'll give you some time to summarize, but if you have a lot more, maybe the members can flesh it out through their questions.

Prof. Martin Blank: Okay. I'll just mention that I'm referring to Lerchl because he's been one of those who's been a naysayer. Anytime that anything has been presented, he has said that he doesn't believe there's any basis for a biological reaction. He has just published a paper saying the reverse. He says, “Our results show that electromagnetic fields obviously enhance the growth of tumours.”

Finally, that last slide I have is about recommendations. I think there are a lot of people being affected by this radiation all the time, and the least we can do is exercise greater precautions.

I particularly worry about the children, because children are sitting in schools six hours a day, five days a week, subject to Wi-Fi that's continuously on. That, I think, is something that doesn't have to be. It may cost a little more to put cables in to supply the same information in the educational programs, but you certainly don't need Wi-Fi to accomplish the educational results. I think it's a sin to have this kind of exposure for children when we don't know if it's safe—and many suspect it is not.

The Chair: Thank you very much.

Mr. Rankin, go ahead, sir.

I'll just advise our committee members that I'll have to keep it tight to seven minutes so that everybody gets a turn.

Mr. Murray Rankin (Victoria, NDP): In fact, I'll take six minutes, please. I would like to ask if you could interrupt me toward the end so my colleague, Ms. Moore, could ask a very short question.

I want to say thank you to the two witnesses.

I must say that your testimony is very, very disturbing. I'm putting myself in the position of a parent sitting at home hearing what you've said, just after we've heard from Health Canada and Industry Canada assuring us that nothing is wrong.

Recently Health Canada sent a fact sheet to our committee. It was modified less than two weeks ago, on March 13. It would seem to suggest that there's really nothing wrong with Safety Code 6 in protecting Canadians. So I must say it's very, very disturbing.

The first question I have is for Doctor Sears.

If I could summarize, in your words Health Canada must review the science from scratch. They have to make the data more publicly available and they have to collect detailed cancer data because what you used to be able to get is no longer available, except at the provincial level. That's a very disturbing conclusion. The fact that the information is not being made publicly available is equally disturbing.

Can you elaborate a little on that?

Dr. Meg Sears: There are two issues here.

One issue is that a lot of data that should have been collected is simply not being collected. An independent brain tumour group is starting up a database, but it's not in place yet. In order to detect the oncoming tsunami of brain tumours, should that happen—and it looks as if we may see an increase in brain tumours—we would have to have detailed information about where exactly these tumours are located. There's also an issue with tumours in the salivary gland, and we're not collecting that data at all.

You need to have detailed data on the location and the histology, the actual details—

● (1710)

Mr. Murray Rankin: What have you been told as to why such data is not being collected today?

Dr. Meg Sears: It's—

Mr. Murray Rankin: Is it because it's said to be provincial jurisdiction? Is it because it's too costly? Is it because the government has something to hide?

I have no idea.

Dr. Meg Sears: I don't know why they are not collecting that data.

Mr. Murray Rankin: All right, but clearly it's important that it be done.

Dr. Meg Sears: It's something which should be captured from public health records. And—

Mr. Murray Rankin: Yes, thank you. You'll appreciate that time is so limited.

Dr. Blank, you started by saying that Health Canada was not measuring the right parameters, that it was focusing on temperature but not looking at the biological parameters. I think you said something to that effect. Health Canada tells us in this fact sheet that I just mentioned that they do. They say:

> ....Health Canada scientists consider all peer-reviewed scientific studies (which includes thermal, non-thermal, and biological effects)....

They claim they are doing what you say they should be doing.

Prof. Martin Blank: Well, I don't see that.

They didn't elaborate what the biological effects were and what the non-thermal effects were. The only one they referred to was the... I forget the particular ones they had about non-thermal effects.

The fact is that they didn't refer to the stress response, which I think is the body's first line of defence in connection with a lot of stimuli that are present in nature.

Mr. Murray Rankin: If there is a stress protein created, as you've suggested, or that some studies that you and Dr. Goodman refer to suggest, the implication seems to be that the creation of stress proteins is a serious thing.

Does that necessarily follow—?

Prof. Martin Blank: That's the body's reaction.

You'd never know that because this was not written by biologists. I'm amazed that at the beginning of the report they put in a word for a chemical engineer, another engineer to come on board. They didn't even mention that they need one biologist. They need somebody there who understands what's going on at the level of a cell.

Mr. Murray Rankin: Here we have your analysis, which has been very clearly presented by both of you. Toward the end of your recommendation, you refer to Dr. Lerchl, from Bremen, who has in the past not been alive to these concerns, but who has recently been concluding that there is a concern. Yet, as recently as March 13, Health Canada puts out to the Canadian public a fact sheet saying that there are no concerns here.

This is very hard for Canadians to understand. It seems that our regulators are not giving this the attention that this deserves. I say "seems" because I'm not a scientist. I have to rely on what they conclude and what you two are asserting.

Prof. Martin Blank: Well, we have been carrying this message out. I'm not a shrinking violet, as you can tell from my presentation. I call things the way I see them. I've published a lot of papers. I was president of the Bioelectromagnetics Society. I've organized symposia on the precautionary principle. I've been active in this and I've made the message go out.

My papers have been published as well. The fact that they have been ignored, that's on the other side of the ledger. These guys don't want to hear it. Why? You may inquire into that as well, because that's an interesting question. The fact is that they have ignored it.

I actually pointed it out when I presented at an earlier review, when the draft of the report was being considered. I made a presentation then and said the same thing, more or less, and it just was not mentioned. The fact that they ignored the papers by Dr. Goodman and me.... We've published many papers on this subject, and it's a very important thing, if I may say so. I mean, this is a basic reaction of cells, and especially when you're interested in harm that's coming to cells, this should be mentioned. It should at least get a footnote or get a reference in there that we looked at it.

Mr. Murray Rankin: Thank you.

The Chair: Ms. Moore, you're going to get a B.C. minute, and that's about 45 seconds.

Ms. Christine Moore: Okay.

In your opinion, should we establish a specific limit for exposure to radio frequency for pregnant women?

Prof. Martin Blank: I think pregnant women deserve a special category. The thing is that they may be classified with the rest of the adults, but the growing fetus in utero, although it's a small target, nevertheless is a far more important target. The fact is that any danger that occurs there will be magnified manyfold. I think pregnant women really need a separate category, and a far more protective one.

● (1715)

The Chair: Mr. Lunney, you have seven minutes, sir.

Mr. James Lunney (Nanaimo—Alberni, CPC): Thank you very much.

Well: you've got my attention very thoroughly. Thank you very much to our witnesses for being here with us.

Dr. Blank, you were talking about bioelectric medicine, if I heard that right, and the effect on cells. Cells are something I'm very interested in. Are you familiar with MENS therapy, microelectric neuromuscular stimulation?

Prof. Martin Blank: Not under that title, but I've....

Mr. James Lunney: It was popular for athletic injuries and so on, starting in about the nineties. Carl Lewis, Ben Johnson, and other sprinters of that era were using it for athletic injuries.

Prof. Martin Blank: No.

Mr. James Lunney: That's one experience using that. They're very low-frequency treatments. You're talking about 50 to 100 microamps. It's low amperage, microamperage, but it's also low frequency, like 0.4 to 0.7 hertz. Of course, when you have very low frequency, you have very long wavelengths, which seem to have a very profound physiological impact.

At any rate, you have my attention with what you're suggesting here about cellular impacts. I just want to read one short quote about MENS therapy, just off the Internet here:

> In 1991, the German scientists Dr. Erwin Neher and Dr. Bert Sakmann shared the Nobel Prize in Physiology or Medicine for their development of the patch-clamp technique that allows the detection of minute electrical currents in cell membranes. This method allowed the detection of 20 to 40 types of ion channels that allow positive or negatively charged ions into and out of the cells and confirmed that electrical activity is not limited to nerve and muscle tissue.

So now we're talking about what's going on in the cell. I think you raised something extremely important on what's going on in the cell. You would be familiar, from your work, with a lot of the interest today in apoptosis. There's a lot of interest in that in cancer therapy

Are you familiar with that term, sir?

Prof. Martin Blank: Yes: programmed cell death.

Mr. James Lunney: Programmed cell death, exactly. It may be that in the body, with 80 trillion to 100 trillion cells, we have up to one million cells per second going through this process of cell destruction, programmed cell death, and recycling without damaging neighbouring cells. It's an amazing phenomenon. Of course there's a lot of interest in apoptosis, because in cancer research now, we find tumour cells are full of an anti-apoptotic protein of several types, and viruses are able to introduce this kind of anti-apoptotic protein. It's key to understanding what's going on in the cells.

Does any of your research indicate that in fact when cells are stressed—you mentioned stress proteins, the cell response to stress—the stress response includes triggers that may in fact induce apoptosis in the cells, which can in fact trigger tumours under the right condition?

Prof. Martin Blank: The answer is that I don't know of anything, but there are about 20 different stress proteins that have been identified, and not all of them have been tagged as to what their specific function is.

It wouldn't surprise me if there were something like that, although cells and their enemies are very clever. They are constantly fighting with each other. You invent a cure and Mother Nature thinks of some way in which the cure can be circumvented. There are all kinds of possibilities.

Mr. James Lunney: Cells are worlds within worlds of activity.

Prof. Martin Blank: Yes, definitely.

Mr. James Lunney: You had my attention when you mentioned DNA. With the data that's compacted in that DNA structure, it's the most efficient information storage system we've identified anywhere in the universe so far. I want to ask you to go back to what you said—because maybe I missed something—about the CTCT sequence at about every 250 base pairs.

What was the implication? Were you implying that ELF frequencies can interact with the genome at some level and have a negative impact? Could you please expand on that?

Prof. Martin Blank: On a sort of a pure chance basis, given that four of these bases are used by the body to make the code and to use the code, you would expect that in 3 billion base pairs you would find one in roughly every 250 lengths. That means there's a possibility of interacting at any point in the DNA chain, and since any point may come at a particular size of loop.... In other words, you may get a CTCT at the very end, with a little piece of chain sticking out. You can get a reaction there, but you can also get one where you have a loop and a coiled coil, which represents a larger one, more like the big ring on the old TV antenna. The DNA has electrons that can respond and do respond to electric fields.

● (1720)

Mr. James Lunney: Was there a particular reason that it was the CTCT, that particular—

Prof. Martin Blank: Yes. That's the one we identified.

Mr. James Lunney: That is bio-sensitive.

Prof. Martin Blank: That's the one we found in the reaction that started the formation of stress protein hsp70.

Mr. James Lunney: Thank you for that. It's fascinating.

Meg Sears, you got all the men's attention, of course, when you mentioned sperm. I know that on TV there was a study on vasectomies, and for the men in the audience, as soon as they brought it up, all the men were caught simultaneously crossing their legs.

Voices: Oh, oh!

Mr. James Lunney: You mentioned brain tumours, especially in children. You mentioned salivary glands.

You mentioned the brassiere for 10 years. It would seem to me that you would have tremendous potential for disruption of cells when you have that device so close to your body. I'm trying to keep mine away from my body as much as possible here—

Voices: Oh, oh!

Dr. Meg Sears: Good plan.

Mr. James Lunney: In my own experience, I can tell you that when I started to carry a cellphone on my waist, I thought a lot about where I was going to put it. I sure didn't want to put it anywhere near my heart.

Dr. Meg Sears: Yes.

Mr. James Lunney: I finally strapped it on next to the iliac crest. The kidneys might be exposed, but hopefully there's a little more shielding there. I can tell you that I felt a pain in my hip when I started to carry that thing 15 years ago, after I was elected, because I had never carried one before. Eventually that pain was shut down. I think that would be habituation.

After 10 years, that pain started to come back, so I've switched to the opposite side. I noticed that when I talked on a cellphone for more than a few minutes, I would get a pain in the temple. That causes me some concern.

That's just anecdotal, of course, but I think the information you're presenting here is a bit alarming, since you mentioned that the literature search ended in 2011—

Dr. Meg Sears: Yes.

Mr. James Lunney: —and I think both of you have alluded to research that has come up since.

This goes back to you, Dr. Blank. Can I ask you to please identify —

The Chair: Mr. Lunney—

Mr. James Lunney: Could I just ask him to identify when the research that he mentioned was done by Mr. Lerchl?

The Chair: Be very brief.

Prof. Martin Blank: That's not published yet, but you can actually find out about it by looking at the *Microwave News.* When this came out, they did a special article on it. Louis Slesin, the editor, has been publishing for years and is a very good information source about EMF. You can look up *Microwave News*.

The Chair: Thank you.

Is there a point of order?

Prof. Martin Blank: By the way, if I can say just one thing that you may be grateful for, people don't realize that the cellphone, in order to operate, has to know where you are all the time, so it is constantly in contact with the tower, which means that it's sending out signals. You don't realize that when you're carrying it.

It's easy enough to shut it off, and then, when you want to know what messages have come in, to turn it on and listen to it. Don't keep it on all the time, because you're getting irradiated.

The Chair: Did you have a point of order, Mr. Young?

Mr. Terence Young: Yes, Chair. I wonder if we can ask the clerk to perhaps find that article and send it out to the committee members.

The Chair: Do you think he'll stay late tonight to get that done?

Voices: Oh, oh!

Mr. Terence Young: Well, that's not necessary—

A voice: It's not published yet.

The Chair: No. They will.

Dr. Meg Sears: I believe it's actually on the university website as well.

The Chair: When it's published, we'll make sure that—

Mr. Terence Young: Meg Sears just said it might be available on the university website. Thanks.

The Chair: All right. Our analysts will dig it up if it's out there.

Ms. Fry.

Hon. Hedy Fry: Dr. Sears gave us protocols of how we should be looking at good research, and so on, and how we should be evaluating it. I noticed that those are not the protocols used for evaluating research by Health Canada when they got their report. They used a totally different set of protocols.

Professor Blank, you are very intriguing, and I think everything you said makes a lot of sense. The body is an electric organism in many ways. The cells respond—

Prof. Martin Blank: *The Body Electric* was the title of it.

Hon. Hedy Fry: Exactly. It responds to positive ions and negative ions, of course, for the whole cellular structure just to work. We look at how people, when muscles are in pain, use electricity to stimulate the muscle. We know that if a heart suddenly stops, the first thing you do is to put paddles on it to stimulate it. The brain works on the same kind of electric stimuli. It's not at all a leap of faith to know that electromagnetic activity will impact the human body in many ways.

You pointed out that there were no biologists, which makes me really think, because one of the things we forget about when we talk about any kind of research is the very basic research. We always talk about applied research and commercially based research and research that will have an impact clinically, etc., but we forget about basic research. Basic research is at the heart of any kind of research.

Biologists are going to be extremely important, especially, as you said, when we are talking about DNA. We know there are lots of things that actually create very different chromosomal activity. We know that age is one, when we look at Down Syndrome in the old days. We look at so many other factors that influence it. So what you're saying makes a lot of sense to me.

I wanted to ask you and Dr. Sears something, because you both mentioned it. Just as basic research is at the core of good scientific research down the road, why is data collection not seen as being essential to any kind of epidemiology? Whether it's basic demographic epidemiology or clinical epidemiology, data collection is inherent. I was told that the government is not collecting a great deal of data to look at cause and effect. I think of the times when we used things without having knowledge and without having data collection and without looking before we leapt. Thalidomide comes to mind. Alcohol's effect on the fetus comes to mind. Nobody ever felt that any of those things could be a problem.

We know we're looking at the effects of environmental exposure now on people with asthma, etc. and at how that is causing huge problems. If we know not only that mutations are caused by environmental stress sources but also that this stress protein you talked about is triggered by exposure to environmental changes and radiation and so on, shouldn't we be collecting good data?

In other words, it's so simple to look at the number of gliomas, to look at all kinds of brain cancers, breast cancers, etc., and to see that there are actually clusters of them. If there are clusters in certain areas, we could figure that out. We figure out a lot of things eventually, long after they happen. I just think the time has now come, with all of the knowledge and the information we have, for us to be collecting good data, looking at epidemiology in a different way, and looking at prevention.

You're absolutely right about the fetus. Pregnant women should be in a different category. We need to be able to look at protecting people. It's too late 15 years after a child has been exposed to cellphone activities or Wi-Fi, etc. at a very young age for us to say, “Oh, Lord. We didn't know that. We should have done something about it”, and then to start really doing something about it. I would think we'd have enough history to tell us about cause and effect over the years and about the way cells work and about how they respond to various things.

Why is it that we heard from Health Canada that data collection, whether clinical or epidemiological, is provincial jurisdiction? That's extremely interesting, given that we're now looking at epidemiology as an international issue. We're thinking that it has to be provincial in this country. Why can it not be federal? Why can't we get that information and look at whether there are other factors, and not simply electromagnetic fields? Why can't we look at whether in certain parts of Canada electromagnetic fields are enhanced by certain other things that occur in those parts of Canada? Who knows what they are?

I just want to hear you talk about data. I want us to get this idea that we must be collecting good data to give us evidence to link things clinically with new diseases, to look at frequency, and all of those things. Can you talk to me about data? I just want some more information, because I really feel that this is at the heart of what we're not doing in this country.

● (1725)

Dr. Meg Sears: We used to do a better job of it.

I have taught a little bit of epidemiology, and one of my favourite things to do at one point was to tell people to go to NRCan's atlas, the Public Health Agency of Canada's website, and there are a few other sites. They used to have a really good website for toxic sites in Canada, through the Government of Canada. All of those have been severely degraded. The atlas is gone.

The data collection for cancers is usually done by the Canadian Cancer Society and StatsCan, but it's very, very crude data that they're bringing together. For instance, you can find data since 1992 on brain tumours and central nervous system, but you can't find glioma or something like that. Hardell could do his studies because in Sweden they were collecting very specific data, and they've been collecting it for ages.

Even though we are now starting up some kind of brain tumour registry, we won't have that data from 1990 to detect a change, until we've had time for a change to happen, so we'll be kind of mid-stream. Why that is happening, I don't know. We need a lot more evidence.

One other concern with radio frequencies is that they affect membranes. Environmental contaminants like lead, or other things that go through membranes and have their toxic effects, may be magnified in the presence of the radio frequencies that are compromising the integrity of the cell membrane. That's a concern that's been brought forward repeatedly, and it's an open research question. There is some preliminary evidence in children that that actually is happening with lead. But, once again, it's not well established; that's one study.

However, we certainly do need to be collecting environmental data, the data in schools, and we need to have much, much better public health data, not only for cancers, but for other conditions as well. That quality has gone way downhill in the last five years.

● (1730)

Prof. Martin Blank: Can I make a comment on this?

The Chair: Yes, sir. Sure.

Prof. Martin Blank: If you collect data, very often it's just an assembly of numbers. If you have a hypothesis, then you can generate something from the numbers.

There was the case of Sam Milham, who was an epidemiologist from the state of Washington. He had the idea that there was a link between the incidence of leukemia in children and electrification. Electrification didn't occur in the United States at the same time; the north and east had it long before the south and west.

He went to different places and started collecting data on the incidence of leukemia, and lo and behold, he found that when electricity was introduced, within a few years there was a jump in leukemia. It correlated with the introduction of electricity. If you look at his data, you see there's a bump in there, and that was the origin of the linking of ELF with leukemia. He knew what he was looking for, and luckily the incidence of leukemia had somehow been collected.

You have to find something that will have the kinds of numbers you want; otherwise, you will just have file cabinets full of numbers.

The Chair: Thank you very much.

We ran into overtime this afternoon. It was a good meeting.

The meeting is adjourned.