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Chair

Mrs. Joy Smith

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● (0905)

[*English*]

The Chair (Mrs. Joy Smith (Kildonan—St. Paul, CPC)): Good morning, ladies and gentlemen. Welcome to the committee.

I welcome the witnesses. This is a very interesting study we are doing, and we have a really good, broad balance of witnesses today. We have with us, as an individual, Dr. Anthony Martin Muc, assistant professor at Dalla Lana School of Public Health, University of Toronto.

Welcome, Dr. Muc.

We welcome the Next-Up Organisation, with Dr. Annie Sasco, the director of epidemiology for cancer prevention.

From the University of Ottawa, we welcome Dr. Habash from the School of Information Technology and Engineering.

From the Department of Industry, we have with us Marc Dupuis, director general, engineering, planning and standards branch, in the spectrum, information technologies, and telecommunications sector.

My goodness, that's a long title.

Welcome.

Also, Peter Hill is the director of spectrum management operations with the same department.

Welcome.

We have a very special guest from Athens: Dr. Dimitris Panagopoulos.

Can you hear me, Doctor?

Dr. Dimitris Panagopoulos (Department of Cell Biology and Biophysics, Faculty of Biology, University of Athens, As an Individual): Yes.

The Chair: We have a teleconference from London, with Dr. Andrew Goldsworthy, as an individual.

If you have a comment, just address the chair, and I will get you in to make a comment. Can you do that?

Dr. Andrew Goldsworthy (Lecturer in Biology (retired), Imperial College London, As an Individual): Yes, I can do that.

The Chair: Thank you.

We have also a video conference from Stockholm, with Dr. Olle Johansson, associate professor, experimental dermatology unit, the department of neuroscience, the Karolinska Institute.

Welcome. Can you hear me?

Dr. Olle Johansson (Associate Professor, Experimental Dermatology Unit, Department of Neuroscience, Karolinska Institute, As an Individual): Yes, I can, and welcome to Sweden. It's a lovely day in the sun here.

The Chair: Thank you for your plug for Sweden. It's a lovely day here, too, with sunshine in Ottawa, Canada. We have good weather. At least we can talk about the weather before we start. Thank you.

We will begin with a five-minute presentation from Dr. Anthony Muc, please.

Dr. Anthony Martin Muc (Assistant Professor, Dalla Lana School of Public Health, Occupational and Environmental Health Unit, University of Toronto, As an Individual): Thank you, Madam Chairman.

The request to attend this meeting came as a bit of a surprise to me. I didn't really have any material to prepare. I simply came to offer my perspective and views on this issue. I think I'll leave it at that and leave more time for questions and discussion.

If you would like to know anything specific about my background or anything, please let me know.

The Chair: Dr. Muc, you have only five minutes. I can stretch it a little bit, but we have a lot of witnesses so I'm going to be pretty tight on the time. I'm a little more lenient when it comes to our guests because we want to hear everything you have to say.

Welcome. Begin, please.

Dr. Anthony Martin Muc: Just to provide some context, I started my career related to microwaves in the early seventies here at Health Canada. I proceeded from that to a job with the Ontario Ministry of Labour, where I was dealing with non-ionizing radiation in a broader sense. I got involved in lasers, microwaves, RF sealers, and all of those sorts of applications in industry and such. I was eventually a participant in the magnetic field study that was carried out by Ontario Hydro in conjunction with Hydro-Québec and Électricité de France.

I took early retirement in the early nineties and have operated as a consulting physicist on these kinds of issues since then. Generally speaking, I've been involved in the standards-setting committees, organizations like ACGIH. The National Research Council of Canada had an associate committee related to environmental criteria. It dealt with chemical and physical agents and their standards and guidelines for that sort of thing. I had a stint with the World Health Organization with the EMF project in 1999.

Basically—how can say this?—I'm a supporter of the standards as they exist. I think they're based on a distillation of all the scientific literature that's been accumulated, probably since the 1600s, going right back to Galvani. People have always been interested in electromagnetic field effects of one sort or another.

As for some of the controversies that exist, there are always indications of associations. It takes a certain amount of accumulation of information and evidence before those sorts of indications cross the threshold for public policy. That debate will continue on all fronts.

Thank you.

● (0910)

The Chair: Thank you very much, Dr. Muc.

We'll now hear from Dr. Annie Sasco.

Dr. Annie Sasco (Director, Epidemiology for Cancer Prevention, Institut national de la santé et de la recherche médicale, Next-Up Organisation): Good morning.

My name is Annie Sasco. I am an MD with doctoral training at Harvard in epidemiology, two master's degrees, and a doctoral degree. I have been working in cancer epidemiology for the last 25 years at the International Agency for Research on Cancer, which is part of the World Health Organization.

During that time I saw a doubling of the number of cancer cases in the world, and that led me to question the reason why. I became interested in environmental contaminants, be they physical, as in the case of ionizing or non-ionizing radiation, chemicals, or whatever.

I have been asked by Next-Up to be a witness here today. I think it's important for scientists to sometimes go beyond the mere statistical results and see, if you are interested in prevention, how to push for policies. I think those types of organizations such as Next-Up are very important in doing exactly that.

On the issue of electromagnetic fields specifically, I have been a witness in several centres on that already, including, last year, in the French Senate in front of the Office parlementaire d'évaluation des choix scientifiques et technologiques.

What do we know today about electromagnetic fields? And what I also want to say is, "When do we have enough evidence to take action?"

With regard to electromagnetic fields, we have, of course. more than plenty of evidence of exposure; I think that exposures in the human population have greatly increased in the last 20 years. That's a very recent phenomenon in terms of frequency of exposure of a population from multiple sources; and even if it's a sole source at a low level, there is the possibility, of course, for interaction and for cumulative effects over time, since exposure starts in utero and goes on for a whole lifetime.

So we have evidence that there is ever more frequent exposure and, in fact, soon the problem will be that no one will be unexposed, which will make comparison difficult, and therefore epidemiology difficult.

With regard to biological effects, more will be said by other witnesses, I guess, but there are two groups, thermal and non-thermal, with the issue of potential general toxicity and whether these EMFs have a promoting or an initiating effect for cancer occurrence.

As for experimental studies, there have been too few, in a way, and most of them have been done by industry-funded researchers. There have been very few public studies done with public funds that have looked at the evidence in animals, although with regard to exposure to carcinogens, animals are usually good cancer models and long-term effects models.

Epidemiology is, of course, the most relevant. What do we know just on cellphones and antennas? There have been many studies on cellphones, the largest one being the Interphone study, with several thousand cases and controls, which was done in 13 countries on glioma, meningioma, parotid gland tumours, and also acoustic neurinomas. The final results should be out, I have been told, in the coming days. For the time being, results for several countries are already out, but not yet, to my knowledge, for Canada.

They show somewhat contradictory results, but nevertheless, in several studies or some studies there is a tendency for increased risk for the heaviest users even if that's defined in different ways. And that's exactly what one expects to see. At the beginning, obviously, we are still young, in a way, in regard to exposure in the population, but it could be just the beginning of a more frequent problem in the years to come. The issue of children being particularly sensitive to this exposure has to be underlined, although at this time there is very little data, and more is needed. Similarly, we need more studies with valid protocols to look at issues of actual hypersensitivity.

So do we already have enough to act on it? I think we have a great level of suspicion and already quite a lot of data that goes in that direction. If we want to wait for final proof, at least in terms of cancer, it may take another 20 years, and the issue then will be that we will not have any unexposed population to act as a control.

We may never have the absolute final proof, but if our goal is to reduce somewhat the burden of cancer and other chronic diseases in the years to come, we have enough data to go ahead with a precautionary principle to avoid unnecessary exposure.

Regulations vary a lot across the countries, whereas population does not vary so much, but we can come back to this later.

I thank you for your attention.

● (0915)

The Chair: Thank you, Dr. Sasco. There will also be time for questions so that you can fill in things that you find are very important.

We will now go to Dr. Habash from the University of Ottawa.

Dr. Riadh Habash (School of Information Technology and Engineering (SITE), University of Ottawa): I am Riadh Habash from the School of Information Technology and Engineering. I work closely with the Institute of Population Health. I have been involved in this field since 1980. My duty is participation in general reviews of most of the areas. Recently we published two reviews, both in 2009. I'm a member of the IEEE Committee on Man and Radiation.

I will go back to my style as a teacher. I always start with the distinction between ionizing radiation and non-ionizing radiation. We are talking about non-ionizing radiation when the electron volt energy, or the energy, is not sufficient to ionize the cellular part or the system and concerns go beyond EM radiation to EM fields, that is, extremely low frequency fields. That means power lines and substations.

I believe that our major concern here is EM radiation. That means mobile phones and some other communication facilities. Based on our reviews and on various lines of study, we have reached certain conclusions, and we can discuss these conclusions during the discussion period.

But again,as I say, there are some concerns regarding further research in certain areas, especially the usage of mobile phones by children and the effects on the brain. That is based on some positive studies, epidemiological studies conducted especially via the Interphone studies. I have addressed those concerns in the brief and I would be willing to discuss those matters during the discussion period if needed.

Thank you.

The Chair: You have another couple of minutes, Dr. Habash. Did you want to make comment on what your findings were?

Dr. Riadh Habash: These are general findings. As I say, the main concern is on the long-term lower-level effects of electromagnetic fields.

As mentioned, we are still at the beginning of our exposure, meaning possibly 10 or 20 years of mainly mobile phone usage. We believe that further investigation is needed. Replication of studies with positive and negative effects also is needed. I believe that further research, mainly on children, is important in this regard. Of course, more epidemiological studies based on the effects on the brain are also needed.

There is an important need for deeper studies on the interaction mechanisms of electromagnetic fields with biological systems, and in that area we can say that little work has been done so far.

The Chair: Thank you, Doctor.

We'll now go to the Department of Industry and Monsieur Dupuis.

● (0920)

[*Translation*]

Mr. Marc Dupuis (Director General, Engineering, Planning and Standards Branch, Spectrum, Information Technologies and Telecommunications Sector, Department of Industry): Chair and members of the committee, it is our pleasure to be here as Industry Canada's representatives.

[*English*]

Industry Canada's basic role is to ensure that Safety Code 6 levels are respected with regard to, firstly, portable radio communication devices such as cellphones, and secondly, antenna towers and their surroundings. Different limits and assessment methods exist for these two situations.

[*Translation*]

I am Marc Dupuis, director general of Engineering, Planning and Standards Branch. My group is responsible for the compliance of radiocommunication equipment to standards.

Each model of new radiocommunication equipment in Canada has to comply with standards set by the department, including Safety Code 6. Equipment cannot be sold in Canada unless the model is certified by accredited bodies through our process. Manufacturers have the responsibility to ensure that their equipment meets these standards throughout the manufacturing cycle. Once the equipment is on the market, the department tests individual units of these models to ensure that the equipment continues to meet standards.

[*English*]

With me is Peter Hill, senior director of spectrum management operations. His group deals with antenna sitings of radio stations.

All antenna installations in Canada must respect Safety Code 6 guidelines for the protection of the general public. Before an antenna can be installed, we require that licensees ensure that emissions from an antenna in areas that are accessible to the public will be within Safety Code 6 limits, taking into account the cumulative effect of other antennas in the vicinity.

Once the tower is operational, it remains a condition of licence under the Radiocommunication Act to respect these limits. Industry Canada also performs audits and tests to ensure that these sites are in compliance afterwards.

[*Translation*]

The procedures that we use in order to ensure that the department's standards for equipment certification are met, incorporate measurement methods developed by international expert bodies such as the Institute of Electrical and Electronics Engineers and the International Electrotechnical Commission. These measurement methods are recognized world-wide as the most reliable way to verify RF exposure. One of the main responsibilities of accredited bodies is to conduct market surveillance activities. They are required to conduct physical audits on selected equipment samples.

Moreover, highly trained staff at Industry Canada's Certification and Engineering Bureau are also directly involved in testing radio equipment to ensure that the individual units available to consumers meet the same standards as the original models.

[*English*]

As I mentioned above, Industry Canada conducts regular audits of antenna installations to ensure compliance. I am confident that, through the various initiatives in place, Industry Canada is taking every reasonable measure that it can to ensure all sites in Canada respect Safety Code 6 limits.

Indeed, our experience, from mathematical modelling to actual field measurements, has demonstrated that for the vast majority of radio communication and broadcasting installations, the RF, or radio frequency, field levels are at a very small fraction of the regulatory limits in Safety Code 6—many thousand times below Safety Code 6 limits. Our measurements use sophisticated equipment that is regularly calibrated, and the measurements are performed by highly qualified and trained personnel.

[*Translation*]

Industry Canada provides a number of documents for the departmental Web site for Canadians concerned with RF exposure. For instance, "Frequently Asked Questions on radio frequency Energy and Health" has been jointly developed by Health Canada and Industry Canada. In addition, a handbook and numerous information sheets are also available. The links to these sites can be found in the appendix to these opening remarks. In addition, copies of the handbook and information sheets have been available to the committee and distributed this morning.

● (0925)

[*English*]

Again, Madam Chairperson, our role at Industry Canada is to ensure that apparatus and antenna installations respect Safety Code 6 limits for the protection of the general public. We rely on Health Canada's expert advice and also ensure that our own personnel have the necessary calibrated equipment and training to perform these complex measurements to ensure compliance in the marketplace.

[*Translation*]

We would be pleased to respond to any questions you may have concerning Industry Canada's role with respect to Safety Code 6.

[*English*]

The Chair: Thank you very much, Monsieur Dupuis.

We are now going to go to video conference, and we are going to start in Athens, Greece, with Dr. Dimitris Panagopoulos.

Welcome, Doctor.

Dr. Dimitris Panagopoulos: Hello. Thanks for inviting me.

I shall try to describe, within a few lines, 10 basic conclusions from our experimental and theoretical work at the University of Athens over the last 11 years on the biological effects of mobile telephony radiation.

Conclusion number one is that GSM radiation at 900 and 1,800 megahertz, from mobile phone handsets, is found to reduce insect reproduction by up to 60%. The insects were exposed for six minutes daily during the first five days of their adult lives. Both males and females were found to be affected.

Second, the reduction of insect reproductive capacity was found to be due to cell death induction in reproductive cells. In the papers distributed to the committee members, we can see pictures of eggs from insects. In the first picture, we see eggs from a non-exposed insect. In the second picture, we see eggs from an insect exposed to radiation from a mobile phone handset. We can see the characteristic fluorescence denoting DNA fragmentation and cell death. You have more pictures like this.

Third, the effect of short-term exposure is evident at radiation intensities down to one microwatt per square centimetre. This radiation intensity is found at a distance of about one metre from a cellphone or 100 metres from a corresponding base station antenna. This radiation intensity is 450 times and 900 times lower than the limits set by the International Commission on Non-Ionizing Radiation Protection, ICNIRP, at 900 and 1,800 megahertz, respectively.

It is possible that for long-term exposure durations of weeks or months or years, the effect would be evident at even longer distances or at even lower intensities. For this, a safety factor should be introduced in the above value, of one microwatt per square centimetre. By introducing a safety factor of 10, the above value becomes 0.1 microwatts per square centimetre, which is the limit proposed by the *BioInitiative Report*.

Fourth, the effect is strongest for intensities higher than 200 microwatts per square centimetre; this is when we have a cellphone very close to our heads. Within that so-called window, around the intensity value of 10 microwatts per square centimetre, the effect becomes even stronger. This intensity value of 10 microwatts per square centimetre corresponds to a distance of about 20 to 30 centimetres from a mobile phone handset or 20 to 30 metres from a base station antenna.

Fifth, the effect increases with increasing daily duration of exposure in terms of short-term exposures of one minute to 21 minutes daily.

Sixth, the effect is non-thermal. There are no temperature increases during the exposures.

Seventh, the effect at the cellular level is most likely due to the irregular gating of ion channels on cell membranes, which is caused by the electromagnetic fields. This leads to disruption of the cell's electrochemical balance and function. This mechanism is a non-thermal one.

Eighth, although we cannot simply extrapolate the above results from insects to humans, similar effects on humans cannot be excluded. On the contrary, they are possible, first because insects are, in general, much more resistant to radiation than mammals, and second, because the presented findings are in agreement with the results of other experimenters who are reporting DNA damage in mammalian cells or mammalian and human infertility. There are many references for these findings in papers also distributed to the committee.

● (0930)

Ninth, reported observations during the last years regarding the diminishing of insect populations, especially bees, can be explained by a decrease in their reproductive capacity, as I described.

Our tenth and last conclusion is that symptoms referred to as "microwave syndrome", like headaches, sleep disturbances, fatigue, etc., among people residing around base station antennas, can possibly be explained by cellular stress induction on brain cells or even cell death induction on a number of brain cells.

Thank you for your attention.

The Chair: Thank you very much, Doctor. That was very insightful.

We'll now go to the teleconference in London.

Dr. Goldsworthy, are you online?

Dr. Andrew Goldsworthy: Hello. I am online.

I'm a retired lecturer from Imperial College London.

The Chair: We want to get your expertise. You have five minutes, Doctor. Would you begin?

Dr. Andrew Goldsworthy: I'll do my best. I have sent the committee a lot of material containing scientific evidence, but what I want to do now is just summarize it, so I apologize for not giving references.

I had a lifelong interest in radio communications and was one of the first people I know to buy a mobile phone, but I'm afraid all is not quite right. As the number of mobile phones—cellphones—expanded, a whole series of weird health effects started to appear.

The cellphone companies had no idea what was causing them and still less of an idea on how to stop them happening. The only solution was to deny their existence, and this is what seems to be happening. They argue that because the results are not consistent, this is due to experimental error and can therefore be ignored.

But this argument is flawed because it doesn't take into account biological variability. We are all the product of thousands of genes that interact with each other and the environment in unpredictable ways. Each individual is unique. Not every smoker dies of cancer, we don't all have the same side effects from taking medicinal drugs, and we can't all be expected to respond in the same way to electromagnetic insults. Just because everyone is not affected doesn't mean that no one is affected.

They also say there is no plausible explanation for such diverse results. In this presentation, I've explained just how these effects, these multitudes of effects, are produced, and how modifications to the signal can put most of them right.

There are two mechanisms that explain nearly all of them.

The first one is based on the pigment cryptochrome. Plants use it to measure light and animals use it to navigate in the earth's magnetic field. Both animals and plants use it to regulate their body clocks.

Now, Ritz and his co-workers, in 2004, discovered that bird magnetic navigation was disrupted by a radio waves because of their effects on cryptochrome. This is also true for insects and probably causes colony collapse disorder in bees. The radio waves don't break chemical bonds, they just interfere with the transport of an electron between two parts of the molecule that is essential for its function.

Cryptochrome also controls circadian rhythms and the body clock, which regulates the sleep-wake cycle and also the immune system. The immune system works best at night. This explains the sleep disturbances found in people living near mobile phone base stations. It also increases their risk of cancer by reducing the ability of the immune system to cope with incipient cancer cells. It might also contribute to the decline of the bees, which are becoming increasingly susceptible to pathogens. As you all know, the loss of the bees would be devastating to our agriculture.

Fortunately, we can do something about it. According to Ritz, cryptochrome is sensitive to a broad range of frequencies, but they're mostly below 10 megahertz. These are well below the carrier frequencies used in mobile phones, but are generated when they are modulated to carry digital information. They are due to harmonics, they are not essential, and they can be suppressed. The cellphone companies should do this straight away.

Secondly, there are effects on cell membranes. Low frequency electromagnetic fields and radio frequencies that have been modulated with low frequencies can remove calcium ions from cell membranes. This weakens them and makes them more inclined to leak, which explains most of the other biological effects such as cardiac arrhythmia.

● (0935)

The heart muscle beats in response to electrical waves propagating through it. These are generated by ions moving across its cell membrane. If they leak, these ion movements are less pronounced and the heartbeat becomes irregular, which could result in heart failure—lack of information.

When cells leak into the surrounding matrix, it can cause inflammation. That which is beginning to show is early dementia. The brain is separated from the blood by what we call a tight junction barrier, in which the gaps between the cells are sealed to prevent the entry of unwanted materials. Cellphone radiation makes this barrier leak to let in toxic materials that can lead to early dementia.

Allergies, which are also on the increase—

The Chair: Dr. Goldsworthy.

Dr. Andrew Goldsworthy: Am I running out of time?

The Chair: You are, but you're so interesting. You're going to be sending us all of your documentation, aren't you?

Dr. Andrew Goldsworthy: You should have it already.

The Chair: Wonderful. That's great.

Dr. Goldsworthy, you'll have an opportunity—

Dr. Andrew Goldsworthy: Well, the thesis was at the end, which you will not now know, to tell you how to put it all right. It's like an Agatha Christie novel.

The Chair: Dr. Goldsworthy, I can assure you that you'll have an opportunity to answer some questions very shortly. Now we have to go to Stockholm.

I hope it's still sunny there, Dr. Johansson. Is it? Can you hear me?

Dr. Olle Johansson: It is, indeed, but I'm sitting indoors, so I cannot really see it.

First of all I would like to take the opportunity to thank you for allowing me to participate on this very important occasion. It is, of course, a tremendous honour to represent the Karolinska Institute and the Royal Institute of Technology in Sweden. Both are famous for their Nobel prizes in medicine and physiology, chemistry, and physics.

To be honest, I'm a little bit at a loss, as I think you say, because I don't know what your problem is in Canada. I guess Health Canada is a governmental authority of some form and your work is to protect the health of Canadians.

My question must go back to you: what is the problem? Do you see a general deterioration of the health in Canada? Or do you have specific diseases or entities of diseases or functional impairments that are rapidly increasing? What is the actual problem to be solved or handled?

I understand from the other speakers that they have received background information, which I have not, and it seems that we are only talking, more or less, about cancer and mobile phones and mobile phone antenna systems.

Here in Sweden, the question is much, much larger than that when it comes to health effects of electromagnetic fields. If that's the issue, or if we are talking about the functional impairment of electro-hypersensitivity, or if we're talking about something else, I would be very happy to answer any form of questions.

Maybe I could just stop there and you could tell me instead what we are going to solve or handle today.

● (0940)

The Chair: Thank you, Doctor. Those are very good questions, because there's been a panorama of information that has come out this morning on both of those issues.

We're going to go into our seven-minute round of questions and answers. I have to say to you that we will be adjourning at a quarter to eleven—this part of the committee—because I have to go into committee business after that.

We're going to begin with the first seven minutes and Ms. Murray.

Ms. Joyce Murray (Vancouver Quadra, Lib.): Thank you, Madam Chair.

Thanks to everybody who presented today.

I'm just going to go straight to Dr. Johansson's question.

Dr. Johansson, this is the second set of hearings we've had. What has emerged is that some intervenors have said there is no research that is causing concern such that there need to be limitations or any changes to the protocols around the use of cellphones or EMF. Others have said that there are thousands of studies showing cause for concern, precautionary action should be taken, and waiting for incontrovertible proof might take decades.

For a committee that has a responsibility on behalf of the public to address potential health concerns, certainly it has been very, very mixed testimony. We will be doing a report and making recommendations to Health Canada, and we as a committee are trying to understand what those recommendations should be.

I would like you to address that question. From your research and the information that you have from your institute, is there enough reason to be concerned and to apply some precautionary principles on this issue? Or do your institute and your work conclude that there's no concern in terms of impacts on people and their health?

Dr. Olle Johansson: I could quickly answer that by repeating what some of the other speakers have already said.

It's obvious that your safety code is completely out of date and obsolete, and that goes for any form of international or national standards body throughout the world, including the American IEEE and FCC and the international ICNIRP standards and so forth.

Low-intensity, non-thermal “bioeffects” and adverse health effects are demonstrated at levels significantly below existing exposure standards. These standards are inadequate and obsolete with respect to prolonged low-intensity exposures. And they are only technical in nature. You have to understand that. I'm surprised that you have invited people from the industry. Health Canada must be dealing with the health of Canadians, not the health of the industry.

Therefore, you should get rid of any form of technical standards and introduce new biologically based public exposure standards that are urgently needed to protect public health worldwide. It's definitely not in the interest of the public to wait.

Ms. Joyce Murray: Thank you. That's a pretty clear answer. I appreciate that.

I'm interesting in understanding, Professor Muc.... You were saying that you have been consulting since your retirement. Can you tell me who generally your clients are?

● (0945)

Dr. Anthony Martin Muc: Well, it has been a variety of clients, clients like CBC, members of the public, various employers who have installations that raise concerns among the workers, and so on and so forth.

I've continued to follow this whole issue. As I said, I was involved in the standards-setting process and the reviews that were done that led to things like SC-6, the ICNIRP standard, and so on and so forth.

Ms. Joyce Murray: Thank you. I appreciate the answer.

I also have a question for Dr. Sasco.

You talked about how most of the research has been done by industry and how, from your perspective, the amount of publicly funded research is inadequate. If you were to be making a recommendation to Health Canada, what kind of research would you recommend that Health Canada undertake? Also, what recommendation would you make for the interim, while that research is being undertaken?

Dr. Annie Sasco: I think I would make a short-term recommendation for research and experimentation on animals, because that's where it's the easiest to compare exposure to electromagnetic fields versus non-exposure—but publicly funded research.

With regard to human health, we need to have more information on the health effects, especially on children, because that population is usually more sensitive to exposure to potential carcinogens. The problem is that if we look at long-term effects, it will take a while before we see it, so I think that in the meantime we should be very cautious in terms of exposure, and I support what has been said from Sweden.

There is no reason to wait to lower the exposure levels of a population. For example, in France, 16 cities have been chosen where the exposure will be limited to 0.64 per meter—the recommended level from the *BioInitiative Report*—to see if there will be a difference in the way people feel in regard to their own health, showing that it's feasible to have lower emission levels. Of course, we will not yet be able look at long-term effects.

So more research, yes, but more research should not delay action. When we see that we had to wait more than four years to maybe see one day that the results of the Interphone study were out, it's really a problem. Of course, public research has been limited so far because of the lack of funding, so there is a need for public funding, totally independent funding on these issues.

Ms. Joyce Murray: Thank you.

Dr. Panagopoulos, you may have answered this already, but I didn't quite catch it. In the insect research that you've been doing at the University of Athens, is the damage to reproductive cells and insect reproduction reversible when they are no longer exposed to the radiation?

Dr. Dimitris Panagopoulos: When some eggs are eliminated because of cell death induction, other eggs are produced. When the population is decreasing and when the effect is in the oocyte—this is the cell that will give us the next generations—then we may have mutations, inherited mutations, in the next generations.

The Chair: Thank you, Dr. Panagopoulos.

Now we'll go to Monsieur Malo, please.

[*Translation*]

Mr. Luc Malo (Verchères—Les Patriotes, BQ): Thank you, Madam Chair.

I am going to continue with you, Dr. Panagopoulos. I would like to know how the Greek government reacted to the publication of your study. In addition, what standards are applied in Greece? I could also address the same question to Dr. Goldsworthy.

[*English*]

The Chair: Dr. Panagopoulos, can you answer that? Did you hear the question, Doctor?

Dr. Dimitris Panagopoulos: What was the reaction of the Greek government to the limits that were set in Greece...?

● (0950)

[*Translation*]

Mr. Luc Malo: No, no.

[*English*]

The Chair: May I try to clarify that question? I think what Monsieur Malo was asking was—

Dr. Dimitris Panagopoulos: The limits in Greece are 20% lower. They were set 20% lower than the ICNIRP limits.

The Chair: Was that a result of your research? Was there any reaction to your research?

Dr. Dimitris Panagopoulos: I don't think they paid much attention to my research.

The Chair: What we'll do now is.... I'm sorry, we've lost the connection.

Monsieur Malo, I'll pause your time. They're trying to recover it, so do you want to go to another guest? I've stopped your time.

[*Translation*]

Mr. Luc Malo: Madam Chair.

[*English*]

I think Dr. Goldsworthy wants to answer.

The Chair: Dr. Goldsworthy, go ahead.

Dr. Andrew Goldsworthy: Yes. It follows on Dimitris' work. There has been some recent work done in Cleveland, Ohio, in Dr. Agarwal's group.

It shows that donated human sperm can be damaged by cellphone radiation in less than an hour. That damage is visible, and it could be used as a test for the safety of mobile phones, Wi-Fi, and any form of wireless communication, the results being available in a couple of days. You don't have to wait 20 years for somebody to develop brain cancer to see whether it's dangerous. You should have the details of that.

Does that help?

The Chair: Yes, it certainly does.

We'll now go back to Greece. The connection was cut off.

Dr. Panagopoulos, can you hear me now?

Dr. Dimitris Panagopoulos: Yes, I can hear you.

The Chair: All right.

Monsieur Malo wants to know if you could answer the question on your research not really being addressed by the government of Greece.

Monsieur Malo, would you please continue?

[*Translation*]

Mr. Luc Malo: I would just like to know why.

[*English*]

The Chair: The question is why, Doctor—

Dr. Dimitris Panagopoulos: Why...?

The Chair: Why didn't the Greek government pay attention to your research? That's what Monsieur Malo asked you.

Dr. Dimitris Panagopoulos: Can you repeat the question, please?

The Chair: Monsieur Malo is wondering why the Greek government did not react to your study and your research. Could you answer that question, please?

Dr. Dimitris Panagopoulos: I don't know why they did not react.

The Chair: Thank you.

[*Translation*]

Mr. Luc Malo: Dr. Sasco, in your presentation, you seemed to be proposing more public funds for research.

Can you tell me if there are situations where studies commissioned by the industry are valid? Can barriers be put up between the authors and those who commissioned the study to ensure impartiality? Can approaches be developed so that studies commissioned by industry are considered pertinent, in your view?

Dr. Annie Sasco: That is a very important question, which is not easy to answer. However yes, of course, studies commissioned by industry—possibly even conducted by industry—can be perfectly valid. So we must be cautious and make decisions on a case-by-case analysis of the protocol for each study.

Having said that, I believe that a serious problem exists when we find results that are relatively unimportant. For example, as regards the significance of the risk, beyond the figure, often what would make a big difference is the way it is presented and interpreted. For example, for studies funded using public funds, that is what led the United States, at one time, to ask that at the end of a certain number of years, in other words once researchers had exploited their results, the data itself be made available for new analysis to see if other people would interpret the same results differently. That is undoubtedly the reason why Interphone is taking so long to appear. There is undoubtedly disagreement as to the interpretation of the results among the numerous co-investigators from the 13 countries: how much is due to a real effect, how much can be the result of bias?

When studies are partially funded by industry as well, as was the case for Interphone, a certain number of safeguards must be put in place that can be... as was done by Interphone, and the funds were managed by the International Union against Cancer. That way, there was not a direct link between the International Agency for Research in Cancer and the financiers, which gave researchers a little more latitude.

I believe a great deal of transparency is required. That way at least once everyone knows what is being done, we can get clearer results. But in the past, several studies have shown that in general, the source of funding, unfortunately, is an extremely important risk factor for the results one might expect, and this is not limited to electromagnetic fields.

Studies today are complex, especially when we look at the effect of low doses with anticipated risks that are generally low and that can be in the future. We must be as vigilant as possible, have groups overseeing the conduct of the studies, and a second analysis of the results by independent teams. Moreover, the same is true for public studies; they are sometimes analyzed again by industry. A great deal of transparency is required; I believe that is the best we can do.

● (0955)

[*English*]

The Chair: Thank you, Dr. Sasco.

I gave you an extra minute, Monsieur Malo. Thank you.

We'll now go to Madam Hughes.

Mrs. Carol Hughes (Algoma—Manitoulin—Kapuskasing, NDP): Thank you.

Gee, there is so much information here that I just want to make sure that I try to put everything together.

Mr. Goldsworthy, you indicated that just because everyone is not affected, it does not mean that no one is affected. I think that really encapsulates everything here.

Dr. Johansson, you also mentioned with respect to our safety code, Health Canada's Safety Code 6, that the guidelines for that are probably outdated, because they talk about thermal effects and you indicate that it's clear we are not dealing with heating effects. I would tend to think that maybe Safety Code 6 needs to be revamped with respect to the guidelines for this particular issue.

My concern is specifically with respect to children as well, for the most part. Maybe especially those from the outlying countries could speak to whether or not there have been studies done with children. It seems that here in Canada there is a data gap when it comes to that. The fact of the matter is that there is no data on the effect on children of microwave exposure on carrier frequencies such as cellphones and Wi-Fi.

The guidelines talk about skin exposure over six minutes. Have there been tests about six-hour exposures here in Canada? Maybe you can just talk about whether those studies have been done in your countries. How is this affecting the schools? In your countries, are schools allowing Wi-Fi? Because we are seeing a lot of concern with respect to having the Wi-Fi in our schools here in Canada.

Mrs. Sasco may have a few answers on that as well.

The Chair: Dr. Goldsworthy, did you want to comment on that?

Dr. Andrew Goldsworthy: Yes, I'd like to.

Wi-Fi in the schools worries me, but what worries me even more is the use of DECT baby monitors, the cordless ones, where the child, a very young child, an extremely young child, is irradiated continuously from a distance of perhaps centimetres. What does that do to the child?

I guess it would be unethical to do controlled laboratory experiments on this, but it's happening all the time. It's worrying. It should be possible to see what the effect is.

The Chair: Excuse me, Dr. Goldsworthy. We're just going to stop the clock for a minute. We're just working on the translation right now, Dr. Goldsworthy.

Can you repeat again what really worries you, Doctor? Some members of the committee missed that.

● (1000)

Dr. Andrew Goldsworthy: What really worries me is the use of DECT baby monitors, the cordless monitors, which irradiate very young children continuously all night long from a distance of maybe centimetres. Now, that really does worry me. It hasn't been tested, and it would indeed be unethical to do controlled experiments on this. It's worrying.

Mrs. Carol Hughes: I did a preview of a short film that's supposed to be coming out shortly with respect to a school in Collingwood, Ontario, where there were some concerns when the Wi-Fi was installed in regard to the impact this would have on some of the kids.

Also, we have Rebecca Ness, the mother of a young son called Keenan. In her own home, she realized that her son started experiencing difficulties when he was sleeping just over top of where the computer was. When they moved the computer, things were fine; they ended up going to a cable plug-in instead.

Over and over again we heard stories. We heard the story of another young person who had chronic headaches. Another one had chronic headaches as well, but not when the child was at home—only when he was in school.

They are actually monitoring these electromagnetic fields. They've been monitoring them outside, and inside the school, the big concern is with regard to the length of time they're actually in the school. We know that Lakehead University in Thunder Bay is actually restricting access to cellphones in the school and to Wi-Fi. Should schools be exempt from Wi-Fi? Should industry have a say as to whether or not this should be in close proximity to schools? I'm more concerned with respect to the children at this point.

The Chair: Would you like Monsieur Dupuis to answer that, Ms. Hughes?

Mrs. Carol Hughes: I think Dr. Sasco has something to say.

Dr. Annie Sasco: Yes. I agree with what has also been said from London. It would be unethical to do studies where kids would be exposed and others would not.

On the other hand, I think we could have a systematic recording by groups of pediatricians on the conditions of exposure of a child—for example, with the baby monitors—and try to follow up on which kids have even minor health problems, whether it is the ones who were sleeping close to such a monitor or not.

It is observational studies that could give some idea of short-term effects. The issue of schools, again, can be addressed in part by observational study, as you described. I know I will be told that this is an exceedingly weak design for a study, but, for example, there could be an experimental design with schools being assigned as having or not having Wi-Fi. If one really wanted to have—

The Chair: Dr. Sasco, I'm going to have to interrupt you. Please try to watch the time. You're going to have conclude now.

Dr. Annie Sasco: Okay. France has decided in several of the schools not to have Wi-Fi, and also the national public library.

The Chair: Now we'll go to Dr. Carrie.

Mr. Colin Carrie (Oshawa, CPC): Thank you very much, Madam Chair.

I want to thank the witnesses for being here today.

I've found your testimony quite interesting. I think it's important for us. I have three kids and I think that at the end of the day we're all looking at the safety factor.

As far as EMFs are concerned, I understand they're everywhere now. I have this on my ear. I have my BlackBerry here. There's Wi-Fi. And we have a building that's fully wired.

The WHO launched a large multidisciplinary research effort in 1996 to study the biological effects of radio-frequency emitting devices. Apparently they evaluated over 25,000 articles published over 30 years and concluded that the current evidence doesn't confirm the existence of any negative health effects.

Are the witnesses aware if the WHO's position has changed since the completion of that study?

Dr. Muc, would you be able to comment on that?

● (1005)

Dr. Anthony Martin Muc: I'm not aware that it has changed.

Mr. Colin Carrie: Can you comment on the study? For me, just looking at it, with 25,000 articles published over 30 years, it does appear quite comprehensive.

Dr. Anthony Martin Muc: It really alludes to the statement that I made in my opening comments. The scientific literature that's out there is immense, and the references and so on are available to the IEEE. They're available worldwide. They're available on the Internet now. Anybody who wants to sit and look at all those studies again, which have been reviewed by committees with due diligence, with responsibility, with interest.... The impression one gets is that industry somehow covers everything up and the only study that's valid, somehow, is a public study.

Well, there have been public studies. Various national agencies have mounted studies. There are a couple of prospective studies on the books now. In fact, there's one in Canada. It's a forward-looking study—prospective, which is the best way to get information. The only thing is that it takes a long time to get the results, just as Dr. Sasco was saying, but that's really the best way to do it.

The problem is to get funding for that sort of thing. I would say that in Canada we have a good prospect for that. There's an Ontario component, but there are components across the other provinces, which could include some sort of dosimetry with regard to RF exposure.

These are possibilities, but the issue is funding for it.

In the absence of these kinds of conclusions that I think will be coming along with the studies that are on the books now, I would still say that for the threshold for advancing and advocating changes like those that are being suggested by our colleagues in Europe, by the BioInitiative group, etc., I think it's premature, under the circumstances, to change policies with regard to Wi-Fi, for example, or cellphones. SC-6 stands, in my opinion.

Mr. Colin Carrie: You mentioned the BioInitiative again.

Dr. Habash, you're nodding your head.

Who wrote it? Were they all scientists? Where did the BioInitiative come from?

Dr. Riadh Habash: In fact, we have given a reply to the *BioInitiative Report*.

Also, as was said here, thousands of papers were published during the past 40 or 50 years, the majority with negative results; there were a few studies with some positive results. It depends on the discipline.

I see the BioInitiative as a collective, or a collection of opinions of a few scientists who really have concerns about this issue, but that doesn't reflect the general opinion. In fact, there are other groups, and there are other studies, other reviews, which see that there is not enough evidence. In the majority of areas, there are some concerns in some research areas. They ask or call for further research into those areas: as we say, the effects on brains, the reproductive outcomes, and the hyper-effects on children.

But I would also like to comment on the electromagnetic hypersensitivity issues. This is a very serious issue, but we also have to understand that these are subjective symptoms. I will tell you a story from Malaysia. I witnessed the story. There was a concern from the public about radiation from a cellular station. Members of the public complained about many symptoms. In the end, it was clear that the cellular base station was not operational.

So we have to take into consideration that it is not an issue of biological effects only; in fact, here we are talking about health effects. I will tell you for sure that an electromagnetic field is a force. And for every force, there is an effect. It is not necessarily so that every biological effect leads to a health effect.

Again, here we have an issue of perception. This is an issue of risk: perception of risk and communication of risk. Sometimes we perceive the risk in a way, while other times we communicate the risk in a way. Many issues are involved and we shouldn't rely on a certain study, because that study has its own characteristics, its own environment, and its own objects. In fact, we have to evaluate the whole body of research in order to come to conclusions.

● (1010)

Mr. Colin Carrie: Doctor, as you were nodding your head there, I was just wondering if you know if there have been follow-ups on the *BioInitiative Report*.

Dr. Riadh Habash: Yes. In fact, this is the answer from the IEEE Committee on Man and Radiation.

Mr. Colin Carrie: Can you summarize it in two sentences?

Dr. Riadh Habash: I can give you the report.

Mr. Colin Carrie: You can give me the whole report?

Dr. Riadh Habash: Yes.

Mr. Colin Carrie: That's great. I appreciate it.

Did you want to comment, too, Dr. Muc?

The Chair: Dr. Muc, would you like to make a quick comment?

Dr. Anthony Martin Muc: Yes, if I may. This committee is not a place to look at the technical issues that are associated with information like the example from our colleague from Greece.

It has always been my opinion that there are difficulties in a lot of the in vitro studies that are done, because there is not enough consideration taken for the fact that the actual distribution of energy within the exposure chambers that are being used, be it for cellular or animal studies, or even the human measurements that have been done in the case of some of the military and industrial studies.... There has not been enough consideration given to the non-uniformities in distribution.

But all of us are familiar with the use of a microwave oven, and we know that you have hot spots in a microwave oven. They all have turntables in order to average out the exposure situation. So when there is attributed a tenth of a microwatt per square centimetre to the average exposure level for a given sample, that does not necessarily reflect the individual sensitivity of individual elements within that sample, be that 10,000 cells or whatever.

The Chair: Thank you, Dr. Muc.

We'll now go into our second round of questions and answers. It's down to a five-minute round.

We're going to begin with shared time of two and a half minutes each for Ms. Neville and Ms. Murray.

Who would like to start?

Hon. Anita Neville (Winnipeg South Centre, Lib.): I will. We'll see whether we're sharing or not. Thank you.

Thanks to all of you for being here, both in person and by video. I am not usually a member of this committee and have just come in for this session, so I've missed the earlier one.

Maybe it's a reflection on me, but I am profoundly confused about what information should be given to the public. I guess what I am most concerned about is Industry Canada. In your comment here this morning, Mr. Dupuis, you said at one point, “I am confident that, through the various initiatives in place, Industry Canada is taking every reasonable measure that it can to ensure all sites in Canada respect Safety Code 6 limits”.

I've just skimmed through the documents that we received from Industry Canada. Again, it's a matter of “on the one hand” and “on the other hand”, as most statements are qualified. What's a parent to do? What's a community to do?

I'm sitting here concerned because in my community there's a telecommunications tower projected to go up very close to where a lot of young people play and are present. I'm sitting here thinking that when I leave here today, I should phone the organization and say, “Don't do it, whatever the benefits are to you financially”. So help me.

● (1015)

Mr. Marc Dupuis: Thank you, Madam Neville, for that question.

First of all, let me say that the differences you're experiencing between the literature we've supplied and the statements I made this morning are due to the fact that the literature is trying to express the body of evidence out there in terms of whether the limits are safe or not safe, and you've heard a lot of discussion on that today. On that, I cannot pronounce any opinion, because it's Health Canada that has the expertise to determine the levels that are safe or unsafe.

Our role at Industry Canada is to ensure that the apparatus, i.e., a cellphone, for example, or a tower, meets the limits that have been deemed acceptable by Safety Code 6, which was, of course, adopted by Health Canada.

So to respond to your question, we ensure, through all the means at our disposal, that every facility meets Safety Code 6. That is the extent: that we have a mandate and that we have capability to ensure that they meet those limits.

Hon. Anita Neville: What is your collaboration, if any, with Health Canada?

Mr. Marc Dupuis: Our collaboration with Health Canada is mostly with regard to preparing information materials to make sure the public understands the issues at hand. Those materials are the pamphlets and the questions and answers that you have before you, which we provided this morning.

The Chair: Ms. Murray.

Ms. Joyce Murray: I've seen a map of cellphone towers for apartment buildings in my riding; it pretty much blankets the city. I noted that you've said your job is to ensure that the code 6 rules are followed, but to what degree do the cellphone towers take into account other sources of radiation that people living in the apartment buildings will be exposed to, whether it's baby monitors, microwave ovens, or other types of wireless tools that they're using?

My guess is that there's a cumulative effect. Is that taken into account in the codes you're applying?

Mr. Marc Dupuis: If you'll allow me, Madam Chairperson, I'd like to defer to my colleague.

The Chair: Yes. Go ahead.

Mr. Marc Dupuis: Thank you.

Mr. Peter Hill (Director, Spectrum Management Operations, Department of Industry): That's a very good question.

When we do our analysis...and we do go out and verify certain sites, certainly higher-risk sites that we feel may approach Safety Code 6 limits. When we do our analysis, we take into account cumulative effects of other radio emitters in the area. Some of them we know about; baby monitors, typically, we wouldn't know about.

That is why we take a prudent approach, which is when it hits a certain level of Safety Code 6.... It depends on the situation, but for example, for, say, 20% of Safety Code 6, we actually go out and take measurements. Our calculations are very conservative and our measurements are always significantly lower.

And to the point—

Ms. Joyce Murray: Could I clarify something there?

The Chair: No. Your time is up. Thank you.

Ms. Joyce Murray: Thermal measurements or just other biological—

The Chair: Thank you, Mr. Hill.

Ms. McLeod.

Mrs. Cathy McLeod (Kamloops—Thompson—Cariboo, CPC): Thank you, Madam Chair.

It has certainly been a fascinating two days of discussion on this particular topic. I think if I had to summarize what I'm hearing, it's that everyone agrees that decisions should be based on science. There doesn't seem to be any disagreement there. There doesn't seem to be any disagreement that we can always benefit from more science in this particular area.

There is some disagreement in terms of the interpretation of the science that's out there, and I do wonder.... Certainly, I'm sitting here, and of course I'm not a scientist, and all the different information that we're getting is a little overwhelming.

There's one thing that I think is important, too, to recognize when we interpret science. I have communities that are very rural and are begging for and craving some of these what they consider to be safety opportunities. I think we need to balance some of that in the equation. When you live on a very main highway and have no telephone access, I think that also needs to be looked at.

For my own curiosity, if you're in a house, for microwave versus telephone and for a child using a cellphone versus texting, are they all at different levels? Perhaps Dr. Habash could answer that.

● (1020)

The Chair: Who would like to take on that question?

Dr. Riadh Habash: Yes. They are all at different levels. It depends on the frequency. Again, it depends on the characteristics of propagation. For microwave or other frequencies, you should also know that these waves are reflected or absorbed by materials.

It involves the attenuation of a signal. If we are talking about extremely low frequency fields, then these fields can penetrate. That is the issue for all TV monitors. Of course, those are issues of concern and some steps even should be taken by users. I personally am of the opinion that the usage of mobile phones should be reduced or the position on the head should change from side to side. This is a source of energy that's very close to your head.

But I am not of the opinion, for example, that exposure limits should be reduced. These are precautionary steps taken by individuals. Again, I am of the opinion that the usage of mobile phones by children should be limited, not only for health concerns, but for habit concerns.

So it depends for the usage of microwave or other sources of energy.

I think you have more comments on this, Dr. Muc.

Dr. Anthony Martin Muc: Yes, if I may, just to follow up on that point. I think what Dr. Habash has raised is really an issue of the distinction between a decision based on science and a decision based on social, political, and personal considerations.

If I understand what he said for his own personal use of a cellphone, for example, he would reduce it, but he doesn't believe in changing the standards because there's not evidence to change them. That's where the science part of it is. The other part of it, as I said, is about involves social, political, and personal decisions—choice. And we live in a free country, so communities, I would say, should have the privilege to ban Wi-Fi if they want to, like Lakehead University did. It is a community and it has banned Wi-Fi. They have every right to, not based on science, but just based on their personal considerations.

Dr. Riadh Habash: I have only one comment here. We also have to consider the advantage of these facilities. I am from a university, and I know what the advantage is of wireless networks in the universities. So I shouldn't ban it because of certain concerns, but as a person I can reduce my exposure in a way. But they shouldn't be banned.

I'll tell you one thing. Tens of thousands of people are killed every year by car accidents. Nobody complains.

This is a technology. Every technology has two sides. There is the good side and the bad side.

Mrs. Cathy McLeod: Do I have any time left?

The Chair: You only have about 30 seconds left, Ms. McLeod, so I think your time has run out. Thank you.

We'll go to Monsieur Cardin.

[*Translation*]

Mr. Serge Cardin (Sherbrooke, BQ): Thank you, Madam Chair.

Ladies and gentlemen, good morning and welcome to the committee. At the last meeting of this committee, I clearly stated that I personally felt the effects of these radio frequencies. When I held my cell phone to my ear too long, I had the impression that my brain was cooking. So I am probably one of those people who are sensitive to that. No one can make me change my mind. I am convinced it has an effect, but I do not know to what extent.

Could you tell me where Canada sits compared to other countries with its Security Code 6? Are there places where the regulations are stricter, without preventing these devices from working properly, as we probably could not do without them now?

How does Canada compare to other countries and are there stricter security codes elsewhere?

Mr. Dupuis, you can probably answer that question.

● (1025)

Mr. Marc Dupuis: Thank you for your question.

First of all, it depends if you compare acceptable and allowable levels for antennas, for example on base stations, or for mobile devices. With respect to mobile devices such as cellular phones, allowable levels in Canada, as in the United States, are lower, and therefore safer. They are lower, with respect to radiation, than those accepted by the ICNIRP—which you probably heard of last Tuesday—and which have been adopted by most countries in the world, including all European countries. They allow a level of 2 watts per kilogram, whereas Canada only allows a level of 1.6 watts per kilogram. We calculate an average based on 1 gram of tissue, which provides for higher results than those used in Europe, where the average is calculated on 10 grams of tissue. In technical terms, this is called "specific absorption rate". As for antenna towers, levels permitted in Canada are slightly higher than in certain European countries for example.

Furthermore, as my colleague Mr. Hill was saying this morning, actual levels measured in the field are often 1,000 to 10,000 times lower than those allowed by Security Code 6. So, if we were to measure levels here in Ottawa, we would find that in most cases, measurable levels are 1,000, 100,000 or 10,000 times lower than those allowable under Security Code 6.

Mr. Serge Cardin: Therefore, Security Code 6 would be amongst the strictest in the world?

Mr. Marc Dupuis: Absolutely, as regards portable devices, but they are slightly less strict when it comes to antenna towers.

Mr. Serge Cardin: And if we wanted to implement even stricter standards, how far could we go without compromising the capabilities of these devices?

Mr. Marc Dupuis: If we wanted to implement stricter standards for mobile devices... If we were to establish a safety level of half of the current 1.6 watts per kilogram, there would be one problem: we would need special devices made only for Canada. Indeed, Canada would be the only country in the world to have such strict standards, much stricter than other countries. Mobile phone manufacturers, such as Nokia and Ericsson, would have to manufacture devices specifically for Canada and no other country, which would make the cost of these phones prohibitive.

As you know, companies make phones for billions of users all over the world. These suppliers would have to make special phones just for Canada, and they would be less powerful.

Mr. Serge Cardin: That would mean that our approach has to be global.

Mr. Marc Dupuis: Absolutely.

Mr. Serge Cardin: That would mean that we have to all agree. We also would need for technicians to improve their methods. Researchers who study the effects of radiation on health need to agree on a protocol to undertake studies which would provide data that we could use—

[*English*]

Dr. Andrew Goldsworthy: Madam Chairman, may I make a comment?

The Chair: You certainly may, Dr. Goldsworthy. Please go ahead.

Dr. Andrew Goldsworthy: Most of what has been said today is concerned with the power levels and alleged heating effects, which most people now who are worried about non-thermal effects don't think are important.

What may be more important is the modulation of the signal; that is, the way the signal strength rises and falls as the digital waves are transmitted. It is that which people think disturbs cell membranes and causes some of the effects that we are seeing, like loss of fertility. It's not so much the strength of the signal, but the way in which it is modulated.

The Chair: Thank you, Dr. Goldsworthy.

Dr. Andrew Goldsworthy: I'll repeat: a nice test for this is on the viability of sperm, because it's very relevant. Anything that damages sperm damages the whole human race. Sperm are particularly sensitive because they are haploid, which means they have only one set of genes, and they are unable to repair doubled-stranded DNA breaks.

The Chair: Thank you, Dr. Goldsworthy.

● (1030)

Dr. Andrew Goldsworthy: Because the normal way in which a double-stranded break is repaired is to cut out the damaged section and replace it with the corresponding piece from the homologous chromosome.

The Chair: Thank you, Doctor.

I have to go to Ms. Davidson now. She might continue this line of questioning; I don't know, but thank you for your comments.

Ms. Davidson.

Mrs. Patricia Davidson (Sarnia—Lambton, CPC): Thank you, Madam Chair.

Thank you very much to everyone who has presented to us this morning. It certainly has been an interesting discussion.

I want to go back to a question that my colleague asked about the World Health Organization's multidisciplinary research effort that was done in 1996. Apparently it studied the biological effects of radio-frequency emitting devices. We've had some discussion on that already. My question is for Dr. Goldsworthy and Dr. Johansson.

Both of you have said that we need biologically based standards rather than thermal standards. In Canada's Safety Code 6, have you seen anything that contravenes or contradicts the study done by the World Health Organization on the biological effects?

The Chair: Who are you directing that to, Ms. Davidson?

Mrs. Patricia Davidson: It's for Dr. Johansson and Dr. Goldsworthy.

The Chair: Dr. Johansson, could you try that, and then Dr. Goldsworthy?

Can you hear us, Dr. Johansson?

Dr. Olle Johansson: Yes. It was a little bit hard to hear the question, but if I understand correctly, the question was about biologically based standards.

You have to understand that what you are talking about are technical standards based upon thermal heating effects in the acute stage measured in fluid-filled plastic dolls. It has nothing to do with the kind of bioeffects that are seen, very, very far below the ICNIRP values or Safety Code 6 values, and most likely you need some other form of measure.

I would rather bounce the ball back to you and say that since I am one of the lousy authors of the *BioInitiative Report*—

Voices: Oh, oh!

Dr. Olle Johansson: —you should really read what the whistle-blowers tell you. If we are wrong, which I hope we are, because we are part of the mental fire brigade, and I want it to be a false alarm, of course, but I think several of the speakers have said....

And Canada, by all means, you are so very rich, you know. You don't any need any economic support from the industry; you can give independent money, give it to the whistle-blowers and independent scientists, because if they are wrong, they will prove themselves wrong very quickly.

As Andrew Goldsworthy said, pinpoint some critical studies—for instance on egg cells, as Dimitris told us, and on sperm cells—because if they are destroyed, then you won't have Health Canada in 50 or 100 years' time.

I think it's very important for Health Canada to set up questions. I don't see them at all; I don't see what you want to do.

My summary of today is that it feels very much that at least the people present in Canada right now want to take a chance on children and the future just for a toy. If I am wrong, I am very, very happy, but please let us look at these studies. Also, remember that you can never, ever outbalance a study showing an effect with studies that don't show an effect; you can only outbalance them with studies that are exact replications, showing and proving why the first study was wrong, and such replications are not around.

The replications that are around strongly support the conclusion that the current standards are obsolete and need to be revised, and actually I didn't say that from the very beginning; it was the European Parliament.

Mrs. Patricia Davidson: Dr. Goldsworthy, did you have any comment?

The Chair: Dr. Goldsworthy, do you want to comment on that as well?

Dr. Andrew Goldsworthy: I would agree very much with Dr. Johansson on this, but I wouldn't be too depressed if I were someone in the cellphone industry, because I think there are ways in which the modulation system can be changed so that it wouldn't have these ill effects.

I have put it into the material that I sent you. Essentially it's a method of modulation that makes the cells "think" that the signal is unmodulated and relatively harmless. It requires a bit of ingenuity on behalf of the engineers, but you could make the things a lot safer than they are now.

I'd like to know what the—

● (1035)

The Chair: I'm sorry, but our time is up, Dr. Goldsworthy.

Dr. Johansson, I know you want to make a comment. Perhaps I'll give the question over to Dr. Bennett, then. Do you want to continue with this, Dr. Bennett?

Hon. Carolyn Bennett (St. Paul's, Lib.): Yes, that's fine.

The Chair: Dr. Johansson, go ahead.

Dr. Olle Johansson: I was also just going to comment that it seems that the members of Health Canada do not quite understand the precautionary principle, which is outlined in the Rio Declaration. You should read it carefully, because it clearly says that minority findings should be fully reported and considered and that uncertainty should be the basis to take action. Action would mean a moratorium, safety precautions, or whatever.

The interesting thing is to look seriously, with adult eyes, on the scientific literature, and take away the studies that don't show an effect, because they are, as you probably all know, of no interest in risk analysis. All the good car journeys would never impinge in risk analysis regarding car safety, for instance. If you look at these studies and really boil down the facts and ask yourself what kind of safety level you would have instead of an exposure standard, today that would be, in thermal measurement, zero watts per kilogram.

Hon. Carolyn Bennett: It would be zero. Okay.

Dr. Olle Johansson: Finally, I would add that I have heard over and over again that the levels of exposure are low. In the room you're sitting in right now, just from the third generation mobile telephony, compared to the natural background that has been around for billions of years in Canada, you are sitting in levels that are approximately one million billion times above natural background. There you have your question mark: are we really built for a microwave life at such extreme levels? From the size, the question is very clear cut: no, we are not built for that, and we are not talking about a minor reduction.

Just a few days ago I submitted a paper to a major American journal. In it, we point to the reductions in public exposure levels. Taking into consideration the future, the kids, teenagers, the elderly, and the adults, the levels must be lowered dramatically.

And if I were Health Canada, I wouldn't bother about the industry. I can tell you that they will come up with new technologies in some form. As a Swede, I hope that it will be Ericsson—

Voices: Oh, oh!

Dr. Olle Johansson: —that produces tomorrow's human-friendly green technology, at exposure levels far, far, far below what we are talking about today. If I'm wrong, then I would be of course very happy to be wrong, but that would also mean that thousands of papers would be wrong at the same time, and that has never, ever happened in science.

Hon. Carolyn Bennett: I thank you for that. I think we do believe that's what the precautionary principle means: that just because something has not yet been proven conclusively to be dangerous doesn't mean it's safe. So I think that if you were in charge of writing the recommendations for this committee.... This committee isn't the arbiter of science, but we are the arbiter of the health of Canadians, and perhaps there are so many questions now being posed that we might want people to go back to the drawing board and have a look.

As a family doctor, in an observational study of baby monitors I wouldn't even know if I was telling the family doctors of Canada what questions to ask in terms of behaviour, let alone how we would go forward with a study like that. I guess some of us are feeling that one of the recommendations would be to have proper longitudinal studies on population that at the beginning would focus on children.

Obviously the regulations—Dr. Johansson and others have been pretty clear—need to be changed. There needs to be a focus on risk and on minimizing whatever risk exists by, as we heard on Tuesday, putting shields in place, and by telling people not to put their cellphone to their ear but to use the wires or whatever. What are some of the things you would want to see in our report in terms of what we, as non-scientists in this area, should be asking and calling upon the government to do?

● (1040)

The Chair: Our time is up. I tried to get your attention, Dr. Bennett.

Mr. Uppal, would you like to continue with that question?

Mr. Tim Uppal (Edmonton—Sherwood Park, CPC): Yes. I'll give a minute for somebody to answer the question of what you would like to see.

The Chair: Thank you.

Who would like to take on that question?

Mr. Hill.

An hon. member: I don't think we want to... [*Inaudible—Editor*].

Mr. Tim Uppal: I don't mind hearing it from government. Let's just see what they have to say as well.

Mr. Peter Hill: I'm not a scientist and I can't speak to Safety Code 6—we rely on Health Canada's expert advice—but I can tell you that in surveys we have done in the environment...and in fact, in a City of Toronto study based on concerns from the City of Toronto, they were considering a precautionary principle as well. In response to that study in 2002, we re-evaluated just last year. We measured at 61 locations randomly selected around the city of Toronto.

The worst case was one-twentieth of Safety Code 6 limits. The best of those 61 locations was 125,000 times below Safety Code 6 limits. The average was about 5,400 times below Safety Code 6 limits. That might just give you a perspective on what we're actually seeing in the environment. Generally speaking, it's very, very well below Safety Code 6 in the general environment.

Mr. Tim Uppal: On that note, with the discussion on Safety Code 6, there's—

The Chair: Excuse me, Mr. Uppal. Dr. Johansson wanted to comment on that.

Mr. Tim Uppal: Sure.

The Chair: Dr. Johansson.

Dr. Olle Johansson: Well, you still have to understand that even if you are on average 5,400 times below Safety Code 6, you are still a million billion times above normal background regarding third-generation mobile telephony.

The interesting thing is that for all other wireless communication systems and exposures, you are mostly much, much higher than that. Therefore, you must ask yourself, do we, through evolution, have an automatic microwave shield built into our body, it being so intelligent, so that it will protect our kids in 2010 from the kinds of exposures produced and manufactured by Motorola, by Ericsson, by Nokia, and so on?

The answer is, of course, no way, we don't have that, and therefore we must stop—

The Chair: Thank you.

Dr. Olle Johansson: The question is this: are we prepared to really take a chance on that? In Sweden, we always try to tell ourselves that it is to be better safe than sorry.

The Chair: Thank you, Dr. Johansson. Time is running out. I need to give Dr. Sasco and Dr. Panagopoulos a chance.

Dr. Annie Sasco: I just want to ask a question: what are the risks of being more cautious? It has been said that already the levels are much lower than what is permissible, so it means that we can really function at a very low level.

If we can function, I cannot see any benefit in going above a risk. As an MD, I would remind you of what Hippocrates said: first do no harm. *Primum non nocere*: when it's not necessary to have even a cause for potential harm, why should we have it?

The Chair: Thank you.

Dr. Panagopoulos.

Dr. Dimitris Panagopoulos: I absolutely agree with Dr. Olle Johansson and Dr. Andrew Goldsworthy.

I do not agree on one little point with Dr. Goldsworthy: that there are, maybe, good and bad frequencies. I don't believe that there are any good frequencies. I believe that all man-made electromagnetic fields above a level are bad for our health. I believe that the existing exposure limits are thousands of times above the levels where we have biological effects.

As we don't have much time, I will let others speak.

● (1045)

The Chair: Thank you very much. Actually, our time is up now.

I want to thank the witnesses so much for coming forward. Also, for any documentation that you send to the clerk, I'll ensure that it is distributed to all of the committee members.

I want to thank Dr. Johansson, Dr. Panagopoulos, and Dr. Goldsworthy for joining us via teleconference. I wish you a really good day.

We'll suspend for two minutes and then go into committee business.

Thank you.

Voices: Thank you.

[*Proceedings continue in camera*]

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