VIDEO of EHS WORKSHOP at the EU Parliament held on April 13, 2023

PROGRAM SPEAKERS

Programme

14:30 Introduction par **Michele RIVASI**, **députée européenne**

14:35 – 15h35 1ère table ronde : Où en est la science ?

Sam J. England, PhD, MP, UK

Frederic Greco, MD, FR

Yael A. Stein, MD, MPH, IS

Dimitrios J. Panagopoulos, PhD, GR

15h35 – 15h55 Pause

16:00 – 17h20 2ème table ronde : Que pensent les chercheurs ?

Andrew A. Marino, PhD, JD, USA

Dariusz Leszczynski, PhD, DSc., FI

Dominique Belpomme, Hon. Prof of Medical Oncology, MD, MSc, FR

17h20 – 17h40 Pause

17:40 – 18h25 3ème table ronde : Que peuvent faire les politiques de santé publique ?

Magali Koelman, MD, EHS Reseau Santé, BE. Absente au workshop, revoir sa présentation:

Dumitru Fornea, European Economic and Social Committee, RO

Klaus Buchner, PhD, Hon. Member European Parliament, DE

18:25 Conclusion par **Michele RIVASI, députée européenne**

18:30 Fin de l'atelier

00:00:00.170] - **Michèle Rivasi**
We need there no Wi Fi, there are no antennas to make sure electrode people could be in this room. So thank you very much for being here today. We are going to address an issue which is a condition that the attribution of several nonspecific symptoms has defined.

[00:00:53.810] - **Michèle Rivasi**
So we wanted to organize this workshop, get it here soon that will be next to me, and it is also scientific data.

[00:01:21.210] - **Michèle Rivasi**

We have here different people coming from different countries who will tell us about their latest research models. And all this will be made available to you through a document that you can grab when you go out, which is abstract.

[00:01:52.710] - **Michèle Rivasi**
There is a high prevalence that requires a better understanding, especially if we want to define efficient treatment.

[00:02:08.090] - **Michèle Rivasi**
The French agency responsible for health in the working environment evaluated in 2015, compared to the population, we reached the figure of more than 25 million Europeans. The report of our agency said that the pain to cope with those symptoms together with psychosocial isolation some of them require appropriate health and social support additional survey system due to EMF and sensitivity representative population equalling nearly 5 million people in the European Union they need the specific condition to be able to work the European Parliament. What is the position of the hypersensitivity to demand people with reduced ability so they can enjoy appropriate protection and opportunities?

[00:03:47.430] - **Michèle Rivasi**
Nevertheless, much of the scientific controversy lies in the absence of a recognized clinical analogy for diagnosis ranging from psychological effects to individual sensitivity with individual responses to EMF depending on individual genetic and epigenetic properties of individuals other experts considering functional impairment or a neurological syndrome and also detoxification system that disturbed by stress.

[00:04:30.950] - **Michèle Rivasi**
As you can see, there is a whole range of hypothesis to account for electrosensitivity. So as we organize this workshop so that it can be made up of three parts first of all, my citizen tried to find out in the scientific world what are the latest discoveries, how the results can be interpreted and what are they.

[00:05:00.170] - **Michèle Rivasi**
Underlying models that may help us better understand the issue of EHS. And finally, last but not least, what are the options of public policy, health policy, that can be privileged in order to improve the quality of life of these people? So buttons do we have to push, we have to press in order to make progress? So that the first file. What are the discoveries, what are the latest findings? Mr Degraco, whom I'm very happy to see here, who's Mrs Stein, Mrs Stein who will be in this video conference, and Mr Dimitrios P from Greece. So, I'm going to give you the floor now to Mr Lennon. I'm going to briefly introduce him. First, you are going to tell us about the ecology of electricity and electrical reception. You come from Bristol University, United Kingdom, an environmental physician with large experience, and interpretation. You've just entered the natural literature. You published very exhaustive scientific articles about insects, animals, birds and mammals, which include, of course, human beings. You have the floor. You have around ten minutes, but don't be too fast for interpretation, please. So, we need to be able to discuss after hearing interventions. You have the floor.

[00:07:57.080] - **Sam England**
Thank you so much for inviting me here to speak to you all., as I was introduced in Berlin, talking about that day was done during my PhD at the University of Bristol in the UK. And what I'm going to be talking to you today about is a little bit strange. Still, it's essentially all the ways that we think that maybe electricity, and in particular naturally occurring electricity, could play an ecological role in the natural lives of many different animals and plants and other organisms. We have the next slide, please. Some of this will be very boring to some of you, it will be old news, but I think it is worth just quickly running through what I mean by some of the words I'm going to be using today. So, we'll do a little bit of physics revision for you all. So when I talk about charges and electric fields, what I'm saying is that with any electrically charged object, this is something that either has too many or too few electrons or protons, these are going to emit electric fields. These electric fields can exert a force on other charged objects.

[00:09:02.010] - **Sam England**
If you have two of the same polarity, so positive and positive, they will repel, but if you have the opposite polarity, they'll be attractive to each other. Now, the reason that we're kind of all here today is that we know that many living things are going to have an excess or a deficiency of electrons or protons. And what that means is that most living things are going to be sources of electric fields. If we have the next slide, please. And so what I set out to do back in 2022 was essentially review what we know about how these naturally occurring electric fields that are coming from living organisms or from the natural environment could play an ecological role for these animals. How might they be using these electric fields to their benefit? And that ended up in this publication available to read in Biological Reviews. And I'm just going to run you through a quick summary of the main findings of this study if you have the next slide, please. So, one of the main findings and one of the primary ones that we came to was that, indeed, many, many animals accumulate significant electrostatic charges as they naturally go about their lives flying through the air or walking across surfaces.

[00:10:15.320] - **Sam England**
If we have the next slide, please. Next slide, please, if that's okay. Now, there are obviously potential ecological consequences for this because it means that animals and other organisms can interact electrically. And one primary manifestation of this is electroreception, the ability of an animal to detect ecologically relevant electric fields. And again, we find that this sense is very widespread, mostly known from the aquatic environment. But recently, more evidence is coming to light about it being used in the terrestrial environment too, for example, by bumblebees, spiders and other insects. But one of the alarming things that we realized when we surveyed the literature is that actually, a lot of the electric sensitivity thresholds for these species are sensitive enough that many anthropogenic sources of electricity, for example, from subsea power cables or overhead power cables in the terrestrial environment are within those detection thresholds. So it's possible that anthropogenic sources of electric fields may be interfering with the electric sense of many organisms. If we can have the next slide, please? But overall, kind of the main finding of our review is actually very little is known about how these electric fields, anthropogenic or not, are being used in the natural lives of these animals.

[00:11:40.180] - **Sam England**
And so what I'm going to quickly run you through, I'm going to give you a very quick whistle-stop tour of some of the work that I've actually done since this paper to try and fix this problem if we go to the next slide, please. And we're going to look at three of the main, most important, really ecological interactions, at least that I could think of, which are pollination, parasitism and predator-prey interactions if we have the next slide. So, to begin with, pollination and if we go to the next slide. So, what I did for this study was I looked, and I tried to measure the electrostatic charge that's accumulated by various species of butterfly and moth that have very different ecologies. Some of them will be diurnal nocturnal, some of them visit flowers, and some of them don't. Some of them are tropical, and some of them are temperate to try and get an idea of how these animals might or might not build up a static charge as they fly through the air. And what we find is that all of these species do naturally accumulate fairly significant static charges as they're flying around.

[00:12:41.640] - **Sam England**
The next slide, please. And the ecological consequence of this is that as a butterfly or moth approaches a flower, a very strong electric field is formed in the order of kilovolts per meter. And what this means is that pollen that's situated on the flower can actually be transferred from the sexual organs of the flower onto the butterfly without any contact even being made. The pollen can just jump across, which of course increases the pollination efficiency for these flowers, which is beneficial for them. Next slide, please. So, moving on to parasitism for this, if we go to the next slide, please. We looked at ticks, parasitic ticks that have huge financial, economic, social consequences with humans because they cause diseases like Lyme's disease and encephalitis with us, but also within our livestock too. We first started out by trying to figure out, well, can typical hosts of ticks carry electrostatic charge too? As an example, here I presented the electric field of a cow. But the same principle applies to things like rabbits, dogs, but also humans that are wearing clothing especially. But we find that, again, these are sources of electric field. And if we go to the next slide and if you go again just because there's a video that should play with this, hopefully it'll play.

[00:14:10.360] - **Sam England**
Yeah. So the frame rate is a bit low on the thing, but you can see that basically, if you expose a tick to a comparable electric field, that what you would find coming from a host, like a cow or a rabbit or a human that they can actually be electrostatically pulled across the air gap, which increases the efficiency of these ticks in finding their hosts. And so we'll talk about this hopefully more in the discussion. But there's definitely room for some kind of mitigation for this strategy of the ticks that could maybe prevent infestations in the future if we go to the next slide, please. So, to finish off, we can talk about probably the most important ecological interaction just because it's so ubiquitous and also fatal to many animals, and that's predator-prey interactions. So, if you go to the next slide, please. So again, kind of following a similar strategy, we measured the charge on a predatory wasp, Vespula vulgaris, and three species of caterpillar that it predates upon. We find that all of these species again carry some kind of electric charge just from living their natural lives. And again, the consequence of this is that a strong electric field is formed between a wasp and a caterpillar as they interact with each other in nature.

[00:15:26.720] - **Sam England**
If we go to the next slide, please. And so what I wanted to see was whether these caterpillars can actually detect the approaching electric field of a wasp. So, I presented them with wasp mimicking electric fields. We find that all three species react defensively either by coiling, by trying to bite the electric field source or by flailing around. Next slide, please. And even more interestingly, we managed to actually elucidate the mechanism for this. So, we showed that mechanosensory hairs that these caterpillars have for sensing sound but also touch, can actually also be deflected by electric fields, and they're able to sense this. Now, really interestingly is that they actually have quite a specific electromechanical resonance around 180 Hz, which just so happens to be the wingbeat frequency of many of their predators. But somewhat alarmingly, we also see that there is still sensitivity around 50 or 60 Hz, which of course, is mains electricity. So, it means that there is a potential here that anthropogenic noise from power lines could be interfering with this sensory system in caterpillars. If we have the next slide, please. But yeah, I just want to give you kind of a quick summary and hopefully we'll be able to discuss in more detail another time.

[00:16:42.660] - **Sam England**
And Jeff, just thank you very much to my funders and the institutions that helped with this work. Thank you very much.

[00:16:59.160] - **Domonic Belpomme**
Thank you. If you have any questions, of course you can ask them now. We can take some questions right away if you want. Yes. Mr. Belpomme, you have the floor. Yes. First, and I'll be speaking French, I would like to say that this part is dedicated to electromagnetic fields in nature.

[00:17:26.170] - **Michèle Rivasi**
Related to a role that has not been demonstrated yet of the causation of EHS that is related to EMFs. So I would like to say that this is a preamble and we consider that EMFs are the cause of EHS. Indeed. All right, thank you very much for this clarification. Now let me go on, and I suggest I give the floor now to Mr. Fredericko, who's going to tell us about the prevalence of migraine within the population of EHS. You come from Montpelier, the university hospital of Montpelier. You did some research about the relevance of the tomo, well, the Ultrasonic cerebral tomosphygmography (UCTS), that is also known as encephaloscan scan. That's something I know in relation to EHS. Mr. Greco developed research on the prevalence of migraine in the population suffering from EGS EHS. Sorry. So if you could do something about our headaches and migraines, that would be great. You have the floor.

[00:21:25.450] - **Frederic Greco**
So, I would like to thank you once again for inviting me here today, especially to talk about this very interesting topic. It's very dear to my heart. Next slide, please. In the University Hospital of Montpelier, we realized that the clinical situation of EHS people was characterized by headaches. We also realized that EHS people had the same profile as people suffering from migraine. And we have a majority of women aged between 30 and 60 years old. We also realized that in EHS people, we have specificities of migraines in six cases

out of ten. And we also saw positive results after treatment against migraine. And so, we wondered whether EHS could be integrated into the observation and analysis of migraines. In 2018, ANSES developed a report about EHS, and it recommends the definition of migraine symptoms to determine whether these EHS people have more migraines than the population as a whole. And to answer this question, we used the French version of the questionnaire to detect migraine. And this was published by our Belgium colleagues. And I would like to seize this opportunity to thank them. They wanted to highlight the prevalence of migraine in EHS people, and we did that.

[00:23:07.070] - **Frederic Greco**
Next slide, please. With the support of associations supporting EHS, such as Hoba Detoir, the Zumblanche Association, and many others that I cannot mention today. But I would like to thank them very warmly. And in the framework of this study, we disseminated a questionnaire, and all the EHS people, adults, French speaking, could actually answer this form and these questions and send them to them, to us. So, we realized that 60% of EHS people were suffering from migraine, and we needed 256 answers, and we received 317, and we analyzed 293. So that was enough to analyze our hypothesis. Now, we only kept the 293 cases because some of them were suffering from CMS only. And as you can see on this map, all the questionnaires came from different regions in France, and including people from the outermost French regions. And according to the results, we can see that 230 patients were suffering from headache, invalidating headaches, and 191 could be considered as suffering from migraine. And this gives us a prevalence of 65%, and even up to 83%. And if we consider that our sample is representative, because this is always a difficulty for EHS, it means that we really have a prevalence that is between eleven and 40% in EHS.

[00:25:00.490] - **Frederic Greco**
It is higher than the prevalence level of this pathology for women aged between 35 and 39 years old. So we're far beyond the figures that we can observe in the population as a whole. Then there's another element that was observed. Thanks to the results of the questionnaire, we realized that very few people suffering from EHS were taking treatment, and they are not taking anything to fight against migraine, even in the times of crisis. And as a conclusion, I would say that this work leads us to make two observations. On the basis of our clinical observations, we can see that the prevalence of the migraines in people suffering from each EHHS is much higher compared to the general population. And we need to go on with this work, with this research. We need some support and then it also highlights that EHS people should benefit from support, from caregivers to receive some help, especially coming from the French association that studies headaches and migraine. So, this is all I wanted to share with you at this stage, and I would like to thank you very much for your attention. Do you have any questions?

[00:26:32.810] - **Frederic Greco Q &A**
Good afternoon. I'm a lawyer here in Brussels, and I have a small question. I would like to know if there are any indications about the prevalence of migraine. Is it a condition that exists or naturally, or is it due to the exposure to EMFs? Well, you need to know that if you suffer from migraine, it means that you have a brain that can really be triggered by many elements. And we know that migraine is an environmental disease because this is an abnormal reaction of the brain to changes, external or internal changes. So that's the

definition in migraine. And there are, of course, factors that can trigger the migraine. And our German colleagues clearly showed that the periodic activity can generate pharynx. And this shows that there is a clear link between this activity and the appearance of migraine in autumn. And this is based on publications on literature. So, migraines can really be the witness of this brain activity. And in very specific circumstances, this can facilitate the fact that EMF's will be detected and this will lead to abnormal reactions. And, of course, they can lead to pain, heart disorders. And this is something that is really related to central sensitization.

[00:28:17.310] - **Frederic Greco Q &A**
All right, thank you. But do you think that the triggering factor could be the EMF? You know, what really triggers the migraine? Well, that's our hypothesis. There is a link between this activity and the fact of having a migraine. And our colleagues from Taiwan showed that in young people, migraines are proportionate to the use of cell phones, and mobile phones. There are two publications demonstrating that. So indeed, if you have a brain that is quite sensitive to migraine, then indeed the EMFs could trigger a reaction with the TRP ones. And I'm not going to go into the details and that would trigger migraine, but this will be the purpose of future research.

Frederic Greco Q &A with Dr Belpomme
Yes, Mr Belpomme Thank you. I would like to make three comments. I believe that Mr Greco will not mind if I make these three observations, first, about the definition of migraine. This definition has evolved through time and we used to have a traditional definition talking about unilateral headaches with auora or symptoms that would actually announce the migraine. They were considered to be always the same. But now this definition has changed. It is much wider today. And I believe that this confirms the hypothesis of Dr Greco.

[00:29:59.680 **Frederic Greco Q &A with Dr Belpomme**
Greco second comment, and I'm sure we'll talk about that at a later stage. We cannot summarize EHS to headaches because of course, they do suffer from headaches, but there are other symptoms, and that's why this pathology is very special. And then last comment. On the basis of my personal experience, the traditional antimigraine treatments do not have a real impact on people from suffering EHS. This is not a scientific fact, but this is something that I have had the opportunity to observe in my clinical trials, in my clinical work. So it's not that simple. And maybe one last comment to reinforce Dr. Greco's presentation. And this is an article that I read. It was talking about a high level of histamine in people suffering from migraine. And this histamine can be found in EHS people. So I believe that there are clear links between the two. This is based on my experience, but it's not sufficient. There must be something else about the sensitivity level. Yes, and I would like to come back to that. It's more or less the same comment, and Fredericka is aware of that. I'm a general practitioner. I work on the ground.

[00:31:35.110] - **Frederic Greco Q &A**
I treat and cure people. And I would like to know, Frederick, whether it is possible to have an opinion based on your work in order to develop recommendations for treatment purposes. Because it's quite surprising to see that 60% of EHS people suffer from migraine, but none of them actually take treatment against migraine. So why can't they benefit from such

treatment? And do you believe that it would be interesting to give that kind of treatment to EHS patients? Well, first, I would like to come back to what Dr. Belpomme said. Indeed, things are very complex. We cannot focus only on migraine. But I believe it is quite interesting to work on migraine, because migraine is something that was studied widely in neurology. So we have research and publications that will enable us to move ahead. And just for your information, in migraine you have histamine, but also other elements. So what she described is really similar to migraine. Then I would like to say that to answer your second question to your question about a treatment, EHS patients do not take that treatment because very often they cannot tolerate that treatment because they're also suffering from the MCS syndrome.

[00:33:03.670] - **Frederic Greco Q &A**
They are sensitive to chemical products. And my opinion is that EHS people do not consider themselves as being ill. Of course, the problem comes from the outside world. It's an external problem. And so taking treatment is like recognizing that you are actually sick. And that's another problem. But in terms of recommendations, if someone goes to a doctor saying, I suffer from EHS. So if the patient comes to the doctor and says, I have a headache, and of course, the doctor will listen to the patient and will try to follow the recommendation. But if the patient comes back and says, I have a headache because I am an EHS person, then very often it's very difficult for them because the doctor will not be ready to listen to the patients in the same way. So, we need to make sure that people suffering from headaches should be listened to and cured or treated as anybody else, whether they are EHS or not. And ever since 2004, we have a law in France, the Kushner Law, which says that we need to deal with pain. Whether you suffer from EHS or not, your pain and suffering should be dealt with in the same way.

[00:34:30.930] - **Frederic Greco Q &A**
So this is not a recommendation for EHS people. It's a recommendation for all people who suffer from headaches and migraine. You have to try to do something to ease that pain, whether you suffer from EHS or not. This is all I wanted to share with you at this stage. All right, thank you very much. So now we're going to give the floor to Yael Stein. I hope she's connected.

[00:36:11.920] **- Dr Yael Stein**
Thank you for the invitation. I was invited to speak because of this very wide review that I wrote together with a colleague. It was published in 2020. What we did was I had been working at a unit, at a clinical unit in which patients come in and they say, we want to check whether there is some connection between our health problems and the medical literature. In the beginning, we saw cancer patients, and then later on, we began to see electrohypersensitive patients. In the beginning, when it just started, 2007, 2008, I think I sold first, maybe in 2009. And then, I went on to Specialize in Anaesthesiology, and I worked at the pain clinic. I also opened my own private clinic. Not private, public clinic, a research clinic. And I brought information from 19 patients who came in, and I'll explain why I brought these patients in a minute. But I wanted to say that when I prepared this very wide review, then the manuscript I initially submitted was 80 pages and had more than 500 references. People always say that there is not enough science, but there is a lot of science, and people don't listen to it because certain agencies say, no, there's no connection.

[00:38:10.990] - **Dr Yael Stein**
We don't know there's no data. But really, there is a lot of data. Next slide, please. So this got a lot of attention. The Havana Syndrome in 2020, sometime after my review was published, there was this publication about this very strange event that diplomats in Cuba, they had suddenly they heard loud noises and they had headaches and head pressure and dizziness and teeny tools and nobody knew what it is. And it's a very new syndrome. So I'm bringing here a few references to show that many people have written about this and it's really not a new syndrome.
Next slide, please. The person who wrote the most about this was called Alan Frey. He did a lot of work for the United States Army in the 1970s. Even in he published about sounds, about noises that people hear which are caused by microwaves. And it's very specific about microwaves and it's exactly the same as these diplomats heard and suffered from. So if you see at the top of this page people say oh, you have headaches from cell phones, how can it be? So I just brought a little bit of his paper. On the left is a quote from his paper and on the right are the previous references of things he wrote about this many years ago.

[00:39:49.160] - **Dr Yael Stein**
But actually he said, of course it's true, many people have written about this. There is a lot of information you're just saying that you don't know because people choose not to read certain parts of the literature.
Next slide please. Next slide. Here's another example. This is a doctor no, actually the one before the one before the Moscow embassy in a minute, never mind. In the slide before a doctor, an MD describes here he describes the symptoms of some patients he saw. A 50 year old man was exposed to microwaves. In the beginning he had a sudden heating sensation and erythema. But later on he suffered headaches, insomnia, irritability, emotional liability. These are exactly the symptoms that were called the microwave syndrome or microwave disease. Next slide please. So one of the reasons that we don't know about this and that many agencies say that this isn't important, is that things like this have been hidden for many, many years. It's not politically correct to say so, but perhaps it's time to say so. In between 1952 and 1966, the American Embassy in Moscow was radiated with low level electromagnetic signals which were considered low, up to 18 microwatt per centimeters square, in my opinion, is very high. (Note: 0.18 W / sq m ICNIRP limit 10 W / sq m)

[00:41:35.260] - **Yael Stein**
But in the opinion of organizations like ICNIRP it's nothing, it's very low. So people were radiated every day from a building alongside. And the Americans discovered this a few years after it began. But they didn't do anything. They said oh, we're just alone level, let's see what happens. So they allowed their people to be radiated. But after the consul died of leukaemia, then they had to go and look into it. There was no hiding it anymore.
Next slide, please. One thing that is important about this is that there were very different, the frequencies were different, and it wasn't like a single wave. The modulations of the waves were random and were changing and were complex. So there has been quite a lot of literature about this which also nobody claims to have ever seen or read. But I happened to read it because the person who wrote it was a professor called John Goldsmith, and his student was my teacher. So I happened to read this. On the right is a table from his paper from 1997. And on the left is a table he made in a book he wrote before he died, which hasn't been published, but it's here.

[00:43:02.770] - **Yael Stein**
And I can share this with whoever wants. So they describe symptoms like depression, irritability, weakness, difficulty concentrating, memory loss. Many of these symptoms are the very exact symptoms that we see today in our patients. Next slide, please. Okay, so my research was actually that I took my original research was that I took the date of my first patients in the first year who came to my clinic. My clinic was just a public clinic in the hospital. I was not paid for it. I am not funded by anybody or supported by anybody. I just do my work because it interests me. And as you can see on the left, on the top, most of my patients indeed had headaches and migraines. The most interesting symptom they complained of was brain fog, which means that a person tries to find a word, tries to say something, and they know that they know how to say what they want, but the word doesn't come to them. They describe it like there is a cloud inside their head and they cannot find words they want to say. And sometimes it's even worse. People can have this when they're out in the street if they are in a specific place, which they connect this to electromagnetic field.

[00:44:30.560] - **Yael Stein**
And after a lot of patients that I've seen, I agree with them that it probably is, so they can get really disoriented. Many of them have sleep difficulties. Many of them become anxious, even up to panic, because they don't know what's happening to them. They become very weak. Some of them have instability, dizziness, falls, nausea. Some of them have earaches and they hear sounds. Some of them describe heart palpitation, tightness in the chest, the muscle cramps, abdominal cramps, joint pain. It's a very wide range of symptoms. But you see that the patients usually don't have all of them. They have like two or three specific ones for each patient out of all this range. And the patient will have the same symptoms every time they're exposed. In a few slides, I'll show you how I saw this in a more clinical setting. Next slide, please. Next slide. Okay, but the most important thing to see is that the outcomes it's not that the person wasn't feeling well, and they went on with their life. These people stopped their lives. So many of them just stopped using devices that emit EMF because at some stage, they understood that their symptoms are coming from these devices, that when they use them, they feel bad.

[00:46:15.070] - **Yael Stein**
They stopped using them. And if they were at a place of work or in school where these devices are used, many children were absent from school; many people left their workplace. They just couldn't stay there anymore. So it's not like a small outcome that these people didn't feel and they had a small pain. No, these people could not continue with their life. And that is what caught me and what made me very interested in this problem. Now, studies have described many, many other outcomes, but I just brought this for you to see. I'm not going to talk about this now. Next slide, please. Regarding the mechanisms, I knew I wouldn't have time if I wanted to go into the clinical side, but I did just bring you one. One of them by Rusner shows that you cannot really diagnose, EHS, people with regular MRIs, brain MRIs, they have normal anatomy and you can't see it, but when you do functional MRIs, then you see that actually, that the connections inside their brains are different from other people. They actually have neural damage or their brain has become different. Either that or they were initially different from other people.

[00:47:49.560] - **Yael Stein**
And when they encountered the microwaves or the electromagnetic radiation that's in the environment, then they behave differently than others. And this has been shown, what's the word, objectively. It's not just the people saying and imagining it. These are real objective findings that have been shown in the pictures. And other mechanisms are, as many people, I think will say now in the meeting, is the overproduction of reactive oxygen species in the cells and the sensitization of the cells because of repeated exposures. Many of the sensitive people having paired detoxification systems, many of them come to actual neural damage. We have a very great scientist today with us. He will explain about his from Greece. He will explain about his idea that the physical theories that electromagnetic radiation should not really affect people just doesn't work in real life because man made electromagnetic radiation is not exactly as the theories say. So theoretically, people are not supposed to be affected, but practically and clinically they are affected because the theories just don't work. Next slide, please. Okay, so this is my most important slide, and I'll go over it quickly. This is after I saw my 19 patients that I brought you the symptoms.

[00:49:42.610] - **Yael Stein**
I saw many, many more patients because I worked for a year and a half at the pain clinic of the hospital. So these were not patients who came because of EHS. We couldn't say it's, no Nocebo effect. They didn't know anything about electromagnetic radiation. They just came because they have pain and nobody could help them. Many people told them like, we don't care, just go to the pain clinic. And they ended up coming to me. And this is what I figured out, that in the beginning, the patient uses the technology and has no idea that this has anything to do with their pain. And then after they use it a lot, those who are sensitive and I don't know if they were initially sensitive or they developed it, but some of many of them develop it. Then they develop one or two or three specific symptoms. And whenever they use a technology too much, then they begin to feel this specific pain. At the second worsening stage, they will feel this pain much faster, perhaps before they could speak for ten minutes, and then they would get a terrible pain here and an abdominal cramp and forget words.

[00:50:49.250] - **Yael Stein**
And then they would get it after two minutes, and then after 1 minute. And then this patient would just throw away their cell phone and say, this device is causing me pain. They understand it because it hurts them. And also, it's important to know that when they stop using the device, the pain doesn't disappear immediately when they become sensitive. It can last for hours. It can last for days after they use it. So you can't say that now. We turn it on and they respond. Then we turn it off. They don't respond. And if they know it's on or off, then it means that they're telling us the truth. The body doesn't work like that. Many of the people don't even know that it has something to do with the electronic devices and their body response. I knew it because they came to me, and I had seen like, 50 more like them. So I told them, Listen, aren't you perhaps exposed to electromagnetic radiation? And then we thought about it. For example, there was a very old Arab man who came to the pain clinic, and he described all electromagnetic symptoms, and he had no idea at all about electromagnetic problems.

[00:52:03.670] - **Yael Stein**
And I told him, Listen, you have an antenna next to your house. He said, no, I don't have anything. I said, where do you live? Oh, I live in an Arab village, and I'm the last house in the village. And what is behind your house? Oh, that's an army base.

[00:52:19.690] - **Yael Stein**
Well, an army base doesn't have any antennas, right? So you have nothing to do with electromagnetics. So that's why I'm saying that it's not no feeble, because many of the patients coming to the pain clinic have no idea about electromagnetic radiation. They haven't heard about it. They don't know about it. They love their cell phones, but they suffer pain. So the next stage was that the patient goes into the pit, which means they have symptoms that just don't pass. And the medications at the pain clinic, we give medications for fibromyalgia, for all sorts of things. They don't work. Nothing works on these patients. The medications don't work at all. They need to go into the bunkers. They have to hide from the exposures. And because they have to hide and they cannot use public transportation if they have a smart meter next to the house. They cannot be in their house. They have to go and find some basement somewhere where nobody's living, where they can be for a while, until their hypersensitivity sort of relaxes a bit. And it takes weeks or months. And I've seen many of them begin to recover. What helps them is sort of fine-tuning of the nervous system.

[00:53:41.380] - **Yael Stein**
They are sort of hyper-stressed. A sympathetic nervous system works too much, and the parasympathetic nervous system is not functioning. So what they need, what helps them is qigong is breathing exercises. I know some clinics give GABA, and some clinics give melatonin to help them sleep. But regular medications, I have seen very, very few patients that respond to it. And the last thing is that in the long term, they do not get back to normal behavior levels. They cannot be exposed. They cannot go in the public transport. Even after, like two years, after their worsening stage, they can feel much, much better as long as they keep away from some of the exposures. When they're exposed, they can be exposed for a short while, and then they need to recuperate for a few days, a week, and then they're okay. They don't have pain all the time. But if you are exposed these people all the time to a smart meter, this person will want to commit suicide from pain. And I've seen them. They really need an environment that they can be not exposed.
Next slide. Next slide, please. Okay, this is just showing how these people cannot hide because it's everywhere.

[00:55:14.520] - **Yael Stein**
Last slide, please. The last slide. I just wanted to say one thing that you cannot base safety standards on averages. The body, the biology does not recognize the average. It's like you hit someone's arm five times with a hammer, then in average, it doesn't hurt them. But actually it hurts them a lot for a short while, and part of the time it doesn't hurt them. You cannot average this. And the signals, the modulation of the signal changes all the time. And the biological cells respond to many different things. And you cannot just average and say, oh, in this number, it's okay. It's not okay. The biology doesn't work like that. That's it. Thank you very much. I'm sorry I took longer than.

[00:56:17.570] - **Michèle Rivasi Q&A on Yael Stein presentation**
Thank you for your presentation. Do you have questions to our speaker? How did you speak? Could I I am not a medical practitioner. I'm not a researcher. But I built an anti-wave (shielded) house six months ago where I take in, EHS, people who stay with us for at least one week. I would like to confirm what I've just heard here. Being out of it for one week is not enough to remove all the symptoms that people suffer. The house I built is below the threshold that is usually used as a reference. And even those standards are not enough. They have become so susceptible that the smallest exposure will recall all their symptoms and they suffer permanent crisis. Plus fears about their environment. The mere fact of seeing a tablet, even a spent tablet, which is not emitting anything on the table, laying on a table, reminds them of their pain and reactivates their symptoms. I got a mail this morning. We get such emails every week from someone who's looking for a refuge as fast as possible because she says her life is at stake, is in danger. She speaks about migraines and different symptoms.

[00:57:56.970] - **Michèle Rivasi Q&A on Yael Stein presentation**
So I think that you biologists, physicians, researchers, you need to do research and find treatments. But we absolutely need areas where those people can take refuge to recover, and they need to be given enough time to recover because, as the lady said, once you've fallen into the pit, it's almost impossible to go back to the surface for certain people. Thank you very much for this testimony. We will come back to the different levels of electrohypersensitivity. I'm going to give the floor now to Dimitri Panagopoulos, who's going to tell us about anthropogenic electromagnetic field voltage, gated ion channel dysfunction in cell membranes, oxidative stress, DNA damage and related pathologies. You are a biophysicist. You live in Greece; you studied physics. You have a PhD in biophysics from Athens University, and you have a PhD in the biological study of electromagnetic field in 2009. And you also studied microwaves and the induction of cell deaths by electromagnetic magnetic fields of wireless communication. I'm not going to give more information about you. I'm going to give you the floor so you can tell us where you have arrived in your research. You have the floor.
[00:59:42.430] **- Dimitri Panagopoulos**
Next, please. We can see the electromagnetic spectrum. On the upper part is the ionizing part. Somewhere between is a very small part, which is the visible part. Just below is the infrared part, and below the infrared, under the lowest line, somewhere in the middle, is the anthropogenic part of the spectrum. And one characteristic of all types of wireless communication electromagnetic fields is that they combine both high and low frequencies. They have RF, or microwave carrier waves, which are modulated and pulsed at ELF's, extremely low frequencies. And they also have random variability by their nature, which is even lower than ELF is UHF in most cases. One characteristic of all man-made electromagnetic fields is that they are totally polarized and coherent. And this is a significant difference from most, if not from all, actually natural electromagnetic fields. So, we cannot confuse natural electromagnetic fields with anthropogenic electromagnetic fields anymore. They are of different nature.
Next slide, please. We live within a natural electromagnetic environment. We have the terrestrial. On the left is our home Earth. We have terrestrial, electric and magnetic fields. They are static, basically, and locally polarized.

[01:01:33.230] - **Dimitri Panagopoulos**
I'm not saying totally polarized, I'm saying locally polarized. And similarly, we have the cell membrane electric field, which is also static, and it is also locally polarized and both fields, terrestrial and cell membrane, they respond when they undergo changes of about 20% to 30% of their normal intensities. Then we have problems we have problems during magnetic storms in human population, which take place every ten or eleven years for a few weeks or days. And during these magnetic storms there are changes, variations in the geoelectric and geomagnetic fields on the order of 20% of their normal intensities. And then we have the cell membrane electric field that whenever it undergoes changes of 30% in the normal membrane voltage, then the voltage gate ion channels they open or close. So we have initiation of health and biological effects in both cases, when the static and polarized fields, they undergo changes, variations of about 20% to 30% of their normal intensities. This is a very important observation, I think, and we must concentrate in this in order to explain more the biological effects of electromagnetic fields.

[01:03:15.540] - **Dimitri Panagopoulos**
Next slide. On the right we see a polarized field, a totally polarized field.

It emits waves that oscillate on a single plane, while an unpolarized electromagnetic field emits waves that oscillate in every possible plane. So it's a big difference. And moreover, the manmade fields, apart from totally polarized, they are totally coherent, also means all the waves emitted by a source, by a manmade source, all the waves are in phase between them. They take simultaneously the highest and the lowest values of them.

Next slide. I'm sorry, the polarization, this huge difference between man-made and natural fields is the is the the cause is the answer why we have problems with a cell phone which has an intensity of 0.1 milliwatts per square centimeter when it's close to our head. And we don't have problems with solar radiation, which is 100 times stronger. The answer is that solar, natural radiation is not polarized, while all anthropogenic fields are totally polarized. And what do the totally polarized fields do?
Next slide, please. I will say it in the next slide. Totally polarized fields, they can produce constructive interference and they can amplify their intensities at certain locations which natural fields, non-polarized, they cannot do it. And moreover, the polarized and coherence fields, coherent fields, they can force all charged particles to oscillate in parallel and in phase with them.

[01:05:09.380] - **Dimitri Panagopoulos**
And we are talking now talking about living tissue, we are talking about the free, the mobile ions which are in billions inside every single cell and tissue, and they are forced to oscillate in parallel and in phase with these fields. And this initiates biological effects. Here we see the main sources of electromagnetic, of man-made electromagnetic pollution, which are high voltage power lines and wireless communication, electromagnetic fields of all types, mobile, telephony, WiFi, cordless phones, et cetera. The first is continuous waves, the high-voltage power lines, continuous waves. The other are pulsed waves, as you can see a sample from a mobile phone signal at the lower picture.

Next slide, please. Here we see the low-frequency pulsations of various types of wireless communication, electromagnetic fields. In the upper left we see the 217 Hz pulsations of 2G mobile phones. In the upper right we see the 100 Hz pulsations of three and 4G mobile phones and base antennas. In the lower left we see the 10 Hz pulsations of WiFi. And in the lower right we see very complicated, which is the final signal from a base antenna, which communicates every moment with hundreds, thousands of cell phones having a signal like the upper right.

[01:06:50.720] - **Dimitri Panagopoulos**
So if you join all these complicated signals, you get a most complicated signal, unpredictably varying its moment, of course, which is the signal of mobile phone antenna.

Next slide, please. Here we see DNA fragmentation from wireless communication. EMFs on the left picture we see is the usual picture of unexposed tissue. These are eggs from fruit flies of different developmental stages. S1, S2, S3 S4 are different developmental stages. And in the right picture, we see this characteristic fluorescence that denotes fragmented DNA. Next slide, please. And some people say you can have effects in animals, but we do not know if we have effects on humans. But cells are basically the same in all animals, including humans. They have the same structures, the same membranes, the same ions, the same organelles, the same everything, the same cellular functions. And since health effects initiate always at cellular level, we can expect the same effect to be in different animals. And that's why we see many basic effects like oxidative stress or DNA damage in various animals and even in plants. Here we see human peripheral blood lymphocytes. The upper left is an unexposed cell. We see the 46 chromosomes are intact.

In the upper right, it's exposed to an extreme dose of caffeine about 300 times higher than the permitted caffeine dose. We see a gap, a smaller aberration in one chromosome; smaller aberrations are called gaps and bigger ones are called breaks. Breaks are bigger gaps, if I should say it simply. And in the lower left we see cell exposed to a cell phone from 1 cm distance. And we see a break with the fragment of the chromosome displaced from its original position. And in the lower right picture from the microscope we see a cell which was exposed to both the high caffeine dose and the cell phone. And we see many more aberrations.
Next slide, please. Some people still wonder whether we have or not effects from manmade fields. But this is simple to be answered. They can go in the Internet, in the Google and type, for example, mobile phones health effects and they will get hundreds, thousands of studies of scientific studies. About 65% to 70% of them they saw effects. If we look more closely to the studies, we see that the studies that they have used simulated signals with fixed amplitude and fixed frequency and fixed pulsations, that's the simulated signals 50 of them find effects and 50 of them, they do not find effects.

[01:10:29.960] - **Dimitri Panagopoulos**
But if we look at studies that having used real life signals, then more than 95% of them they do show effects. So we get a very strong indication that variability, apart from polarization and coherence and intensity and the existence of low frequencies of pulsations and the duration of exposure, which are very important parameters, the variability of the signal, it's an extremely important additional parameter for the bioactivity. Next slide, please. We have

ICNIRP recommendations that they are adopted by governments to protect people from electromagnetic fields. They provide no protection. ICNIRP recommendations actually provide no protections because in this table we can see on the left we can see different fields, different types of fields. In the second column we see the ICNIRP limit for this field, for each of these fields. In the third column, we see the threshold intensities above which are recorded biological and health effects. And we can see that the threshold intensities for which biological and health effects are recorded are thousands of times and even millions of times, in some cases lower than the recommended limits by ICNIP.

[01:12:22.930] - **Dimitri Panagopoulos**
Next slide, please.
Okay, what if I could summarize the way effects take place? I would say man-made electromagnetic polarized, electromagnetic exposure causes dysfunction of voltage-gated ion channels in cell membranes. This dysfunction alters the intracellular concentrations of critical ions such as calcium and potassium, and sodium and structure of the voltage-gated channels on cell membranes and how the dysfunction of those channels can cause all these effects that we're talking about. If I have time later, maybe I will talk more about this. Thank you very much.

[01:15:49.480] - **Dimitri Panagopoulos Q & A Dr. Fornea**
Yes, Dr. Fornea I am quite impressed by your presentation because it's coming with some very interesting findings. My question is related to the technology that is used for the 5G technology, the beam forming solutions, because you said about this intermittence multiplexation and stroboscopic effects of the transmission in the we have here a graph and we'll show it to you. We presented before in February when we had the previous meeting. And it's like a laser system of transmission of the signal which is targeted to the receiver and this will happen in millions of times and milliseconds and so on. What we can expect in the future collaborated to what you said in this presentation, the fact that might have an effect on the DNA structure of animals and humans, what we might expect as a consequences in the future from not taking the right measures regarding the ICNIRP exposure and other things which are related with this. And we will talk afterwards, of course.
[01:17:11.410] - **Dimitri Panagopoulos Q & A Dr. Fornea**
As I said, variability is an extremely additional important, extremely important factor for the bioactivity. And all wireless communication electromagnetic fields are each moment unexpectedly varying. They are extremely varying, and this is by their nature. And with every new generation of wireless communication EMFs, the amount of transmitted information increases, so the variability of the signals increases as well. And the more people they use the same antenna, the variability increases. We have more pulsations and the unexpected variations of the signal, they become more and more with every new generation. So, taking this situation, we can reasonably expect that with every new generation, we have more intense biological and health effects. That's my expectation.

[01:18:29.180] - **Dimitri Panagopoulos Q & A Rob Van Der Boom**
Thank you very much. With the knowledge you now have about the process, would there be an option to go in a certain direction with technology that the biological effect will reduce instead of being larger?

[01:18:47.040] - **Dimitri Panagopoulos Q & A**
Well, if there is really a will for that, we could sit and talk all the experts in technology and the scientists, we could try and find a solution. It's a matter of whether there is willing for that or not, I believe.

[01:19:08.280] - **Rob Van Der Boom**
So basically you have no idea in what direction that would go, because it first needs to be investigated.

[01:19:18.870] - **Dimitri Panagopoulos Q & A**
I have some suggestions for protection in my last slide, which is basically avoidance of exposure. And as people, as colleagues who are specialized in electrohypersensitivity, they already said that avoidance of exposure is a basic step that you have to do to restrict the symptoms. So, it's avoidance of exposure. It's all a matter of will of our society, I believe.

[01:20:02.200] - **Dimitri Panagopoulos Q & A Question from Klaus Buckner**
Well, our examples of avoidance in Switzerland tried it. But my question is, how about phase shift modulation? Is it a change you are talking about?

[01:20:20.720] - **Dimitri Panagopoulos**
Yes, face shift is also microphone, please.Phase modulation. And face shift is a type of modulation. We can have amplitude modulation, which is maybe the most useful, or frequency modulation. But phase modulation and phase six also are changes in the signal. Also, variate the signal. Absolutely, yes. But in most types of wireless communication EMFs, we have simultaneously various types of modulation and this makes it even more bioactive.

[01:21:05.900] - **Dr Belpomme**
I'd like to come back to the very important elements that were highlighted by Dr Panagopoulos about the variability of the anthropogenic EMFs. So those we are creating compared to natural EMFs, that distinction was very important. He also highlighted the pulses that exist and this is very important. The polarization and the pulses, these are very important elements. And then there is another element that he didn't have the time to develop in his presentation, but he did mention it, he talked about radio frequencies that are associated to very low frequencies. That's another very important information. And in the past we said that radio frequencies were to be considered separately, but we also have associated radio frequencies and this is something that I have learned from this cooperation. And then as to the mechanism that is being suggested, I must say that I do not agree with Dr. Panagopoulos and he is well aware of that. I believe we need to make a distinction between the impacts of EMFs on the body and what we call EHS. And here we want to talk about electrohypersensitivity and I believe that we should have a different mechanism.

[01:22:47.480] - **Dr Belpomme**
Now of course, this does not exclude the fact that the mechanism submitted by Dimitri. can be associated, but it cannot focus only on EHS, because EHS is when you have a lower threshold to EMFs. So, I believe it highlights this biogenic mechanism that is different. And this is something that I will try to expand upon in a few minutes when I have the floor.

Maria Rivasi
Thank you. I have a question. When I looked at your slides, I realized that you developed experiments with different waves, but also caffeine. And I would like to know why you use caffeine. Does it actually amplify and increase the DNA fragmentation?

[01:23:39.680] - **Dimitri Panagopoulos**
Caffeine is a factor very frequently used in radiation biology laboratory the they expose cells to big doses of caffeine and it's considered that an extreme dose of caffeine, it disables the protection of the cell, it disables a certain point of the cell cycle that would initiate protective mechanisms. So, it was easy for me to use these doses, these high doses that they are frequently used in radiation biology laboratories and compare the effect with cell phone. That's what I did. And as for Dr. Belpomme, whom I very much respect as a scientist and his work in electrohypersensitivity, we have a different view in the details, I would say, of the actual mechanism, which we actually we don't know yet in every detail. Dr. Belpomme supports the idea that there is something different in electrohypersensitivity than in the wider frame that my proposed mechanism works. Yes, but if it is a reality, if it is a fact, if it is proved that is a fact that we have oxidative stress, then it's a common factor that joins your view with my view. And possibly also we should take into account that the neural cells, they have higher percentages of voltage-gated ion channels because they perform the transmission of the neural pulses which are sodium and potassium voltage gated ion channels. That's my view and it is for your consideration.

[01:26:26.370] - **Maria Rivasi**
Well, since I was talking about caffeine, I would like to invite you now to a coffee break. You see, that didn't come out of the blue. Thank you. Thank you very much. We have a five minute coffee break before the next panel.

[01:45:24.050] - **Maria Rivasi**
Let's start with the second panel in which we will look at the underlying model. We have tried to look at the impact of waves based on your latest research work. Now we're going to look at your hypothesis. We're going to first hear about Mr. Andrew Marino, who's going to tell us about electromagnetic hypersensitivity, a neglected neurological syndrome. So let's call him, find out if he's logged in. He's a biophysicist. He's got a PhD in law from the University of Syracuse, and he joins the Veterans Hospital in Syracuse in the New York State. Then he worked in the departments of Orthopedic Surgery, Neurology, Cellular Biology at the Shrezaport Medical School in Louisiana. He published many articles, and he suggests that we should see EHS as a neurological syndrome. So, what is it all about? Let's look at this neurological syndrome that might help account for EHS. Because it's fine to look at the symptoms, but how about the underlying models? What do we know exactly about them? So, is Mr. Marino online? Mr. Marino. Good afternoon. We can see you. You are with us. So, you have ten minutes to explain your model about electrosensitivity.

[01:47:47.200] - **Andrew Marino.**
I'm Andrew Marino. My training is in biophysics and law, and for about 50 years, I've worked full-time in the area of biological effects of electromagnetic energy research and teaching in two medical schools in the United States. I decided that the most efficient way I could use

my allotted ten minutes today would be to pose and answer five specific questions. The supporting evidence for what I say is on my website.
First, what is the state of the science today regarding electromagnetic hypersensitivity syndrome? EHS, the subject of this meeting. In my opinion, the science is woefully bad. Um, it's almost all anecdotal, and the part that is experimental was certain to fail because of it's experimental design limitations. Much work is needed to permit EHS to be understood so that proper guidance can be provided by physicians who treat the disease.
Second, why were most studies certain to fail? Historical factors are important. In the 1930s, biochemistry developed as a subspecialty in science, and in the process, biochemistry excluded electromagnetic energy as being necessary to help explain living systems. The founding fathers of biochemistry held that chemical energy alone was sufficient. In the 1940s, biochemical dogma backed up a little and legalized, from a scientific point of view, electromagnetic energy for the purposes of explaining heat and shock.
Otherwise, electromagnetic energy was excluded from the canon of biochemistry as being unnecessary to explain the behavior of living systems. As a consequence, electromagnetic energy research in biomedicine went unfunded generally, and nothing about electromagnetic energy was taught in medical schools. Key names in this historical development are Handler in biochemistry and Schwann in electromagnetic energy.

Third, what were the subsequent developments? A persistent pattern occurred regarding the health impact of manmade electromagnetic energy in the human environment. One of the first instances was the Moscow signal. American diplomats in Moscow were irradiated by a microwave beam that resulted in numerous medical complaints by embassy personnel, including the death of three or four successive. American ambassadors to Russia. That incident led to a major study in the United States, mostly in secret, regarding the validity of those claims. After several years, the people involved concluded that there were no effects and that the conditions complained of by the employees were unrelated to electromagnetic energy. Following soon thereafter were other sources of man-made electromagnetic energy in the environment. Microwave ovens, for example, in the late 60s created a lot of confusion and concern and complaints of a medical nature, particularly cataracts, but not limited to cataracts.
But again, after a spate of studies and concerns and Blue Ribbon committee meetings, it was considered that there were no real effects due to leakage from the microwave ovens. High voltage power lines were next in line. In this pattern, a grid was built across the country to allow electromagnetic energy to flow through the company from one side to the country, from one side to the other. The idea was that the energy was going to be passed through wires. That was the general understanding that the energy was inside the wires. In reality, the energy is outside the wires. It's physically impossible for the energy to be inside the wire. But outside the wire it extended laterally from the wire two 3400 meters depending on the voltage of the power line. And human beings lived chronically and worked in that energy field. That situation raised much concern, that much interest, many allegations of health risks and health problems cancer, particularly childhood cancer. And in the end, another Blue Ribbon Committee advised the government that there were no real problems and there was nothing to be concerned about. Radio and TV towers expanded their ratio.

[01:54:37.500] - **Andrew Marino.**

And amount of energy being radiated. So people who lived and worked in the vicinity of these towers were chronically exposed to very high energy densities unlike anything throughout the period of human evolution. The story was the same. The government, based on advice from selected experts, decided that there was no problem, no health risks, nothing to be concerned about. Then came cell phones, which are just an absolute fixture of the world today, and I always will be. They send electromagnetic signals to a power to convey voice and video, but they also send energy into the green. And governments worldwide were required to set some sort of standard. And the basis they used for setting a standard was the result of the early work done in the 1940s regarding heating. As long as the signal into the brain did not heat the brain, it was defined as safe. There were no substantive studies that considered other mechanisms other than the thermal mechanism EHS then developed and it raised many concerns just like the previous indicators of consequences of electromagnetic energy in the environment. And we have this present concern today. The latest, even beyond, even after EHS was the Havana signal, which is now the American diplomats are not in Russia.

[01:56:27.160] - **Andrew Marino.**
They're sitting in their embassy building in Havana, Cuba, being irradiated with a microwave and other form of energy beam. And again, there are allegations, particularly of the people being exposed, that it's making them sick. So you can see it's an old and continuing story. And in each of these cases scientists, unbiased scientists reported that the energy had effects based on experimental laboratory studies. But the official government reports concluded there were no real effects.

Four considering now only EHS, how is it possible to conclude that there were no real effects? That the complaints of the people who have the syndrome are psychological or psychosomatic psychiatric but not real? That failure was the only possible result of the published laboratory research because invariably, it was funded and controlled by stakeholders. Their research designs used a linear reductive model exclusively. If a little energy really does something, then twice as much energy should do twice as much. If it doesn't, then we reject the hypothesis initially that it did something. In addition to the limitation of a linear reductive model, the assumption was made that heat production was the only possible coupling mechanism between electromagnetic energy in the body.

[01:58:36.080] - **Andrew Marino.**
This research design was a complete misfit for the phenomenon of EHS, which is linear and nonreductive. Consequently, the results of the stakeholder controlled research were inexorably negative and they politically overwhelmed and continue to politically overwhelm the results produced by unbiased investigators.
Lastly, why aren't nonlinear nonreductive studies on EHS done today **money?** There aren't any sources of **funding for unbiased investigators**. Consequently, the outlook for people suffering from the syndrome, the electromagnetic hypersensitivity syndrome is bleak. I'll answer any questions that I can.

[02:00:00.120] - **Maria Rivasi**

I suggest that we should listen to the three interventions and then other questions. Mr Marino was not really optimistic. I'll speak French. Do you think the situation you describe from your USA perspective, do you think the situation is a bit different in.

[02:01:49.060] - **Dr. Rafaelovich, Q &A Andrew Marino**
Think maybe Russia has another approach of the problem and says that it is really a problem for population and maybe Russian people know that electromagnetic fields are weapons and maybe we have in other parts of the world some people who.

[02:02:53.510] - **Andrew Marino.**
I heard a statement about the validity or the state of Russian science, but no question.

[02:03:15.790] - **Dr. Rafaelovich question posed by French english speaker**
The question of the Dr. Rafaelovich, was that one? The secrecy and the failure of the research on the electromagnetic fields on living beings isn't it related? Maybe because of the fact that there are military challenges and military research weapons with electromagnetic fields. That's why maybe there is some secrecy and opacity.

[02:03:48.330] - **Andrew Marino.**
Undoubtedly the other arm of the resistance to recognizing true reality is the economic, military and economic combined to keep the field from developing.

[02:04:17.120] - **Maria Rivasi**
I have a question, Mr. Marino why we are going to win with pesticides like glyphosate in USA and in Europe? Why we don't arrive to win with electromagnetic fields? Because we have a lot of studies but we can have the proof between electromagnetic fields and electrohypersensitivity. You see, I don't understand why we have no correlation, we have no link between electromagnetic fields and the disease like electrohypersensitivity.

[02:05:15.220] - **Andrew Marino.**
Well, if I understand your question why we do not have more knowledge about hypersensitivity? If that's the question, the answer is obvious we don't have the scientific research to answer the questions that are being posed. I have to urge that it's a huge problem in itself with a historical precedent which I described but you refer to pesticides, that's a completely different problem. I see no link between the two, except that the same two factors.

[02:06:00.000] - **Maria Rivasi**
There is no link between pesticide and the electromagnetic field. It's about the lobby yes, the lobby is very strong with EMF but we arrived to we with EMF and we cannot arrive to Weed with electromagnetic fields.

[02:06:27.880] **Andrew Marino.**
But I must say that you use the word lobby what the lobby consists of is a set of owned scientists. The people who testify before government panels are experts, they have PhDs, they have MDS and they have massive conflicts of interest. So, if you're going to break this cycle you're talking about, you have to have people who are before the councils of

government, who have the proper education, who are going to talk about science and not anecdotal results, but are unbiased and unbought by the money interests, namely the military and industry. The hub that makes this thing work is the scientists who are going to testify misleadingly or falsely and it's a huge history of that occurring that's where this cycle has to be attacked and broken.

[02:07:34.480] - **Klaus Buncher Q&A**
Just a short remark to that it's not only the industry, it's normal people, they are afraid we want to take handy mobiles from them. So, I get a lot of opposition from normal people who try to attack me just because they're afraid.

[02:08:09.250] - **Dr Belpomme Q&A**
To what has been said, I would like to add that the who is largely financed by phone operators, telecommunications operators, so it's a vicious circle. And there is another aspect to be taken into account. It is the fact that scientists on the one hand and associations of sufferers on the other hand as structures where individual egos prevail and they are not joining forces enough.

[02:08:59.650] - **Andrew Marino. Q&A**
Nevertheless, we have a scientific base question that is fundamentally not scientific but legal and the decisions are going to be made on the basis of values that are accepted by our legal representatives. You can't gain, say, that fact if you stick strictly to the scientific area. We just go around in circles and we're faced with an infinite redress. I wasn't talking there. I was talking at a more general level, trying to frame the problem generally.

[02:09:47.870] - **Dr Belpomme Q&A**
Thank you. Maybe if we see the report of the NASA in 1981 on the topic of the electromagnetic field interactions with the human body, observed effects and theories, maybe we can consider that at that time, in 1981, they knew something. Maybe today some people knew a lot more, but there could be a cover-up. Thank you.

[02:10:22.730] - **Andrew Marino.**
It's the same point from a slightly different perspective, the same point that was made by earlier questioners. There's no doubt that the information exists, but the information is meaningless unless it's presented in a manner that's understood by the people who make national policy. And the people who make national policy almost always hear from industry-related or military-based experts who are going to give advice based on their personal interest. That's what they were hired to do. That's the key area that has to be considered. If there's going to be any change in this periodic pattern that I described earlier, I don't see that happening right now. I'm hopeful it's going to happen tomorrow or next week or next year.

[02:11:36.270] - **Maria Rivasi**
All right, we're going to give the floor now to the next speaker because the questions we are raising are already related to the third panel because we're already trying to understand why

we have obstacles and then what we could do to unlock these policies. So I would like to hand over now to the next speaker, Dariusz Leszczynski, who's going to tell us about his hypothesis. He's online? No, he's with us. Welcome to the club. I'm very sorry. I thought you would join us online. So, you're going to tell us about public health, and scientific facts because you believe that this is a neglected neurological syndrome. You come from? The Helsinki University in Finland. You are a science and policy blogger, radiation and Health, chief editor of Radiation and Health, and you have done research on electromagnetic fields and health. You wrote two articles about EHS, and I would like to hand over to you immediately. You have the floor.

[02:12:52.650] - **Dariusz Leszczynski**
Thank you very much. And thank you very much for inviting me. So, let's start with electromagnetic heaver sensitivity. It exists, but we have one problem, one major problem already mentioned by Andrew Marino. Our science is of very poor quality and scientifically methodologically. It is unacceptable.
Next slide, please. So, first of all, individual sensitivity, there is known, well-known phenomenon of individual sensitivity. There is no problem. We know it in science. We know that there is individual sensitivity to other types of radiation, like ionizing radiation, ultraviolet radiation, ultrasound. Everything depends on how much this radiation we are applying to human being. And so, logically and paralogism (a piece of illogical or fallacious reasoning, especially one which appears superficially logical or which the reasoner believes to be logical) with those other types of radiation, individual sensitivity to wireless radiation must exist. Next slide, please. And there are some examples from current studies; maybe they are not best, but indicating that individual sensitivity exists. For example, in epidemiological studies, when scientists were looking at the possibility of development of cancer due to exposure to mobile phone radiation in the highest exposure group, people who used the most cell phone, only few had increased risk of developing brain cancer. Not everybody who was highly exposed had this increased risk of developing brain cancer in US national Toxicology Program this rats and mice study. In this highest exposed group of inbred rats, which are genetically very similar, only few have developed cancer. Even though all those rats in this highest exposed group were exposed to the level of radiation that was on the border of warming up their body or warmed up their body up to one degree celsius, only few of those rats developed cancer. So, meaning majority of them, even though they were all the same in bread rats, they didn't develop this problem. And of course, this is very common in laboratory studies. In vitro exposed cells, either animal or human cells, different types of cells have different sensitivity in different way. They react to electromagnetic fields. So, it is scientifically, not only logically, but also scientifically justified to claim that individual sensitivity exists for wireless radiation exposures.
Next, please. I published few studies recently. First one was review of scientific studies on EHS. Another was review of health policies on EHS. Then is questionnaire study that I just finished and it will be submitted this month for publication. It is questionnaire study asking electrosensitive people how their diagnosis was made. And finally, opinion article where I call for consensus debate on mobile phone radiation and health and asking are current safety guidelines sufficient to protect everyone's health.

[02:16:48.000] - **Dariusz Leszczynski**

Next slide, please. So, in this first study, few conclusions from this review of EHS research to date. First of all, majority of the studies didn't find any link between EMF and EHS. But there are problems. EHS studies have examined solidly acute exposure. So, meaning people were exposed, and then they were during exposure or just after were asked what they feel. Some people complain that they can get symptoms much later, that it takes hours or even days. So these studies couldn't detect it. Another very big problem is scientists don't know whether EHS volunteers volunteering for this kind of studies have correct self-diagnosis of EHS or whether the diagnosis is incorrect. And then this experimental group is contaminated with non EHS persons. And when we have several non EHS persons in such group, all this statistical analysis afterwards doesn't work. And we can think about extreme situation that none of those volunteers had really EHS, but they had something else causing their symptoms. So, this is the problem, very big one. And then of course there are those phenomena of nocebo and placebo which are nocebo specialists being used to explain what is EHS. It is just a psychological, mental problem.

[02:18:36.520] - **Dariusz Leszczynski**
But those phenomena nocebo and placebo, they indicate how our mind can affect our physiology. And therefore it makes that studies on EHS, when we ask how do you feel? Are unreliable because nosebo and placebo our mind can affect our physiology, how do we feel? And then of course, this opinion that there is no causality link between EHS and EMF is unproven, because research data is insufficient to prove this. And research should focus on finding biochemical markers for the diagnosis of EHS.
Next slide, please. In second study I looked at health policies around the world concerning EHS and I analyzing many organizations, many countries, lots of documents, and there is currently no effort to develop health policies for dealing with EHS, no matter what causes EHS. And national governments follow the opinions of WHO,ICNIRP and ICS and are not developing any practical health policy advisories for Self-declared. EHS sufferers because there is according to WHO, ICNIRP and ICS, there is no connection between, no causality connection between EHS and EMF exposures and symptoms experienced by self-declared EHS persons affect their well-being and according to constitution of the who, they are a health problem.

[02:20:29.260] - **Dariusz Leszczynski**
So it is not only this whether we can prove other health problems, just this affecting well being by being worried and concerned about EHS people is enough to be defined as a health problem which should be taken care of and independently of what causes EHS symptoms. This admitted health impairment should be dealt with globally by developing some uniform health policies around world.
Next time then. I know from my own experience dealing with EHS people that very many EHS persons claim or informed me that they have physician diagnosis. Therefore, I thought what if some physicians somewhere around world they know something or they have some better ideas and maybe they have some knowledge that could be useful for studying of EHS. And I sent to volunteers questionnaire and it shows after analyzing this questionnaire that currently it is not possible to medically diagnose any ailment as being the result of EMF exposures. And this so-called medical diagnosis of EHS are based solely on the anecdotal

evidence presented by EHS persons and some scientifically unsubstantiated tests used to claim to diagnose or detect EHS. They were never demonstrated to causally link EMF exposure with physiological symptoms of EHS.

[02:22:31.870] - **Dariusz Leszczynski**
We have different markers being studied and also, in this questionnaire came up various markers that were analyzed, but none of those markers were shown that it is being induced by EMF exposure in human being. And of course, then further research using biochemical methods and controlled EMF exposures in volunteers is needed for identification of relevant set of diagnostic biomarkers.
Next slide, please. And then of course, we have these opinions about EMF exposures and health effects that are when you open Google and listen to what is said there. They took basically two opposing groups saying everything is being caused by EMF, nothing is being caused by EMF and some people like myself in between. And so I recommended conveying a roundtable debate that would assess the current status of the science on wireless audition and health, including those diverse opinions on EHS, because they are and this roundtable debate would review the adequacy of the current safety guidelines because this is the problem. Are those safety guidelines sufficient? Some people say yes, some people say no. And of course in this current situation where there are significant gaps in knowledge and the situation of the to date executed studies are largely considered of poor quality.

[02:24:24.620] - **Dariusz Leszczynski**
And this is general notion or let's say on what most of EMF researchers agree. This is one consensus that we know that science is of poor quality. Then it would be reassuring if scientists with diverse, often opposing opinions would come together and debate this science and figure out in which direction we should go. Is it really nothing or is there really something? And therefore, I ask currently, when EMF science is of proven insufficient quality. What is the scientific, ethical and moral responsibility of scientists when they use this poor quality science to claim that human health safety is being already assured?
Next slide, please. And in conclusion, research should be on general sensitivity, not solely on EHS research. EHS is nothing special from sensitivity. It is one of the symptoms of sensitivity or outcomes of different sensitivity. Research should focus on finding diagnostic biomarkers. Of course, varying sensitivity may lead to a variety of health-related effects like cancer, like fertility changes, like neurobiological disorders and like EHS in different people, not every exposed person will become sensitive and not every sensitive person will develop the same health problem. They will develop different health problems. And of course, this what is uncharted area completely is possibility of the co-effects of EMF, radiation and environmental pollutants, different chemicals which we encounter in our everyday life.
We don't know about this almost anything. There is just a handful of small animal studies showing that there can be co influences of EMF and chemicals. Thank you.

[02:27:00.090] - **Maria Rivasi**
Thank you very much. Are there any questions? No questions? Yes.

[02:27:14.250] - **Dariusz Leszczynski Q& A - Rob Van der Boom**
Okay, I have one small question. You say we need biochemical indicators that are needed to exercise EHS. But I also have the feeling that there are responses to the heart which is not

necessarily a chemical reaction. Would that also be a marker in your view? What kind of responses? The heart rate response for instance. Yes, there are some studies indicating that maybe there is or there might be impact on heart rate. But as I said, there is not enough of this research and it should be of better quality. But yes, of course, this kind of effect if there is possible to consistently show that heart rate can be affected it can be one of the bioeffects. Of course.

[02:28:25.750] - **Dariusz Leszczynski Q& A - EHS suffers**
Hello, thank you. I have EHS, so I apologize because my brain fog is already setting and I apologize if I'm slow. You said that with the medical diagnoses, they were all just from personal accounts more or less that there was no medical diagnosis really because of no established cause effect relationship. And at this point I want to say that from the European Rights courts in Strasbourg, there is an extract or review of cases about industrial and environmental hazards. And in these cases, in this extract there is this sentence the extract was made from the house itself that it is accepted as evidence. Personal accounts are accepted as evidence in court if there is not enough science for clear cause effect relationships.

[02:29:34.270] - **Dariusz Leszczynski Q& A**
We are talking about two different things. One thing is proving that person has EHS and using some biomarkers to detect and diagnose EHS on in population. This is one thing. And another thing is this self diagnosis or stories, accounts of people who suffer of something, I don't know, is it caused by EMF for sure or is it caused by some other factor? And this is another thing. So this is this anecdotal evidence which is showing how life of those persons is impacted and as I already mentioned, according to WHO it is health effect. So, this is one thing. But another thing is that these are very personal experiences of those persons, very different, varying from person to person, from country to country. And therefore, what we need, we need diagnostic tools like biomarkers, whether they are chemical or other biomarkers that we can reliably detect. Of course, it will not be one biomarker. We need larger set of biomarkers, and some combination of them will be possibly indicating higher or lower probability that person has this kind of or is impacted by EMF exposures. But these are slightly two different things.

[02:31:35.930] - **Dariusz Leszczynski Q & A - F Greco**
I would like to make a comment. There is no marker for depression, for migraine. However, millions of people have this diagnosis and they are being treated. So the search for a marker is a need, but it's extremely complex, whatever it is. And I would like to wish you the best for your research.

[02:32:05.090] - **Dariusz Leszczynski Q & A**
Yes, I do agree. And if you would read my review of EHS studies, no, they're at the end. I'm just referring there to search for biomarkers of headaches and migraines, which is ongoing. And there is think that indeed migraine or headaches are sort of anecdotal evidence somebody feels a pain. But there are ongoing studies to find ways how to measure this pain and how this pain can be sort of diagnosed and objectively shown. Because always one may say oh, I have a headache and I want to skip day at work. But now there's another question.

Can we show this objectively that person has headache or not? Right now we cannot. We have to rely solely on this. But we should look for those biomarkers. And these studies looking for biomarkers of pain are ongoing and there are references showing what's happening. But the same should be done with EHS. So far right now EHS is just based on anecdotes as. Some people who have written to me, when I ask how you were diagnosed, when I called my doctor, I told him my story, he or she didn't see me at all over phone, gave me diagnosis that I have EHS.
So this is solely based on this story. How reliable it is, that's a question to think. But in any case, doesn't matter how difficult it might be, we should look for it.

[02:34:29.170] - **Comment from EHS person**
Thresholds or earlier in their lives, or if there's some genetic or epigenetic predisposition that makes us all safe, that only those EHS people might get problems. When I listened to Madame Stein, I understood that it's something like a sliding scale or it's something, but most EHS people don't have any symptoms in the beginning. And then there's some event that starts the disease or the progression of the disease. And listening to that, I wonder if.
It really makes sense to look for biomarkers.
Because if it's a worsening thing. Has recovery options in the beginning but not later, and then after non-exposure.
Gets better, I wonder if the outlook on finding biomarkers is so good, if.
The hypothesis is true, that each and every one of us could get EHS.

[02:36:03.230] - **Dariusz Leszczynski Q & A**
First of all, you don't know whether it is so. Meaning, your starting point for your logical thinking is that you don't know, because you don't know whether everybody of us can get it or not. And as it is always with individual sensitivity, everything depends on those so.

Let's think this way. Now is the spring season. Some of us get allergies and some of us suffer, majority doesn't. But there are some years where this spring is such that there is more pollen in air. More people get this, which on normally every year basis don't have it. But suddenly they get it on some special year, because there was so much of pollen. And same thing is here, that when we go with this radiation exposure sufficiently low, then we are minimizing this, that vast majority of us will get something, but only small majority, those unfortunate to be more sensitive. And therefore, if we look at safety guidelines and if we look can we still lower our exposures and improve technology this way, that it will work well with this still lower exposure levels. We are minimizing number of those people who will get sensitized to this radiation. So, it is rather not this way that be desperate and say well, everybody can get it. No, this depends on those. So, if we go sufficiently low and exposure guidelines right now are fairly low, so there are not so many people suffering of EHS. But if we can press it still down, then we should improve this so that still less people will be so sensitive that to these very, very low doses, lower doses will be reacting.

And as for biomarkers, it is always good to have biomarkers. When you have an allergy, you go to physician, you get a prick test and you know what you should avoid? In your foot, in your air and so on and so forth. The same goes for biomarkers, for EHS. If you have a biomarkers, once you have them, you may think about how to prevent those biomarkers to be activated. Meaning you can figure out maybe there is some antihistamine that works for

allergy. Maybe you can figure out something, some chemical which would work for your EHS symptoms and modify them or turn them off. So, this is important part of biomarkers. One thing is diagnosis, and another is thinking can we figure out some medication that would help people to live normal lives?

[02:39:50.370] - **Yeal Stein Q & A**
Welcome Dr Belpomme. Sir. It was quite a good answer. Some of our friends sometimes there are the people like Dariusz said, that always think in one way and some always in another way. And Darius is in the middle. Sometimes he gets into trouble with some of the scientists because of that. It was a very good answer. But I would like to say something about your question about the sliding scale. I took out one slide, which was important. And what I saw in my patients relates to several things that Dariusz said. One of them is that many of them really do have a genetic, genetic hypersensitivity. They are hypersensitive in their characters, in their behaviours and they are sensitive to other things as well. The second thing I saw is some kind of I call it priming, an event in early childhood. Many, many of the patients have a story. If you really dig in and I'm good at occupational history taking, you find things like a response to vaccines in early childhood, or a child who's very sick with some disease, with some fever in early childhood, or someone who fell and hit their head. There is some trauma.

[02:41:23.470] - **Yeal Stein Q & A**
Sometimes it's even the parents got divorced when the baby was one year old and this person becomes more sensitive even besides the genetic factors. And then you have a long, long-term exposure to many factors. Many of my EHS patients were exposed for many years to air pollution. There was one who was, for example, he was a technician in the central bus station, and he was exposed to fumes from buses all over for 15 years. And. There was a woman who lived across very, very near like 2 km, near the most polluted place in Israel, with factories, with a lot of pollution. And when she was exposed to electromagnetic radiation, where she went, she developed. The sensitivity much faster than other people because she already had this long-term exposure to other things as well. Which also links to what Dariusz said about the connections. I see the connections to various types of stress. It's not all the people who developed EHS have something in their background which caused them to be more sensitive. Besides the genetic factors, other factors that they encounter during their life. I'll give just one example of a very strange case, I saw a man who was 40 years old with a lot of brown markings on his skin, like an old man.

And he had epilepsy that didn't respond to any medication. It took me a lot of questioning. At the end. I discovered that this man was born in a city in the United States where there is an atomic plant and it is on a beach. And they used to put the water of the beach to cool the plant, and everybody used to bathe in the water from the radiation. So, it's no wonder that a person who had this exposure in childhood will later be much more sensitive to electromagnetic radiation than other people. I hope that answers some of your questions.

[02:43:50.590] - **Maria Rivasi introcduction of Dr Belpomme**
Mercy Andres of I'll give the floor to Dominic Belpomme I'll come back to certain things you said because I do not entirely agree with everything but never mind I'll give the floor to Dominic Belpomme who is going to tell us about markers because Mr. Belpomme is

different from others in the sense that he worked with a cohort of EHS affected people more than 2000 people and he tried to identify markers. Precisely. I would like to make a remark about what has just been said. We need to distinguish the real causes from the risk factors. So there may be a cause for EHS such as a chemical or an electromagnetic field, we should distinguish it from risk factors which are favouring factors. For example, if we take tobacco consumption smoking you have well, the fact of smoking is a risk factor, but the real causes are the carcinogenic molecules that are in tobacco smoke and the residual tar that you take in after burning. So, causes have to be distinguished from risk factors. That's something I wanted to say in reply to what has just been said first. Of all, I would like to reassure the electrohypersensitive people in this room by saying that the medical and scientific community at the international level is united in the momentum to secure the recognition of electrohypersensitivity.

Dr Belpomme
There has been many publications not always easily accessible by lay people, but they exist, and to such an extent that I'm currently negotiating with the WHO. And Dr. Marianne Hera, who's the manager of the WHO Health and Environment Department, to organize, as we did it in 1997 in Atlanta, to organize well, we are trying to organize a similar meeting about electrohypersensitivity. Well, all this to tell you that despite the opinions we hear all over the place and despite the obstacles, we're making progress. Science is making progress. It is slow, but it will get somewhere, and that's my optimistic view that I wanted to share with you. Now, there are three problems. Now we're talking about electrohypersensitivity. In the past we spoke about electromagnetic field, electromagnetic fields and the toxicity, the toxic effects of electromagnetic fields. Now we're speaking about electrohypersensitivity. There are three problems that doctors, that physicians and scientists have to cope with the suffering of the ill people and the evaluation of that suffering and the medical diagnosis. And according to my information, WHO is looking at how hypersensitivity EHS can be properly diagnosed and a true issue, it was said already what is the share of electromagnetic fields as cause of electrohypersensitivity?
What we are showing is that electromagnetic fields are partly responsible, of course, but also chemicals are incriminated. Chemicals have a lower share in that phenomenon than electromagnetic fields. So, we use as a basis scientific evidence. We're not only bringing words to the table; we are looking at the scientific evidence published in serious journals. Well, we worked on a cohort of 2000 people. It's the largest series of people, the largest group of people that has been studied. Then each patient has been examined. It is not a questionnaire that has been submitted to them for them to fill in. It is an examination, a medical examination with a diagnosis, a proper diagnosis, a neurological physical exam, and you'll see the contrary, that contrary to what the who says certain symptoms are objective. They are seen when there are skin injuries. Well, you cannot deny them otherwise, you deny medicine as a whole. And thirdly, the most important point is that in 25% of the cases, EHS is associated to MCS (multiple chemical sensitivity), and MCS can make it more complicated the multiple chemical sensitivity and in most cases MCS has not been taken into account as associated and compounding EHS.

[02:49:50.440] - **Dr Belpomme**
So, I'm going to try to tell you about these different elements as briefly as I can.

Next slide. It's on now; the presentation is the following we present here the results we obtained from the analysis of a large cohort of more than 2000 electrohypersensitivity and or multiple chemical sensitivities. So we confirm our previous findings showing that both EHS and MCs are associated in 25% of the cases and shared identified symptoms and biological changes in the framework of a common neurological syndrome. I heard well in the literature that there are two or three publications, not more than that, that it is a neurologic syndrome which means that the patients have been examined by a physician. No medical diagnosis can be established without the intervention of a physician.
Next slide, the inclusion criteria are very specific in our study. As far as MCS is concerned, we have used the Atlanta consensus criteria, while for EHS we have used the WHO 2006 criteria and we have added to those criteria other criteria which you are going to see chronic evolution. Well, we have reproducibility of symptom occurrence under low-intensity levels of presumed electromagnetic magnetic field source, the regression or disappearance of symptoms when incidents are removed.

[02:52:07.130] - **Dr Belpomme**
Well, these are the Atlanta criteria. What we add to those are the following criteria the absence of any other known pathology accounting for the observed clinical symptoms and the absence of any pre-existing pathology such as atherosclerosis, diabetes, neurodegenerative, degenerative or psychiatric disease. Well, in addition to those criteria, there is a host of additional criteria. It's very important. We have, we have examined our patients as Hippocrates did, just like Hippocrates wanted us to do it by listening to what the patient said, but by also decoding in an unbiased way what they were telling us.

Next slide. So we examine our patients with a systematic face-to-face questioning and a physical examination of all included patients. So, we cannot be criticized for using a nonmedical methodology. So these are the evolutions of these 2000 cases. Let's skip it. Let's skip the following one. This is very important because we have found out what everybody finds in the studies mentioned. Well, in all the studies that can be found in the literature, a clear dominance of women, and there is no difference between EHS and MCS. More women than men and the majority is at the end of their them have an association of EHS and MCS as if there was a sexual marker, a genetic sexual marker that enables us to say that women are more hypersensitive than men.
[02:54:55.380] - **Dr Belpomme**
So there are more women than men in our cohort.
Next slide. We confirmed that in 25% of the cases, there wasn't a physician between EHS and MCS. So out of 2000 cases, 2000 patients, while all these people were examined by one, one single person, the analysis were carried out by the same lab specialized in identifying markers. So it's a very reliable study.
Next slide. The symptoms. Well, it's quite complicated to read, so I'm trying to summarize, I'm going to try and summarize them. The main symptoms I'm not well, you have called migraine, what I call headaches, but well, we can discuss that. What is important in EHS is its predominance. Well, we compared with a control group. Of course, 100 people were in our control group. There are significant differences in all symptoms, expect hypermobility that were found among a number of control group patients. But for all other symptoms, there was a very clear difference between the control group and the EHS patients. So we compared, EHS? With MCS. Well, both patients have headaches, you have MCS, you have

headaches, you have EHS, you have headaches, but you have more frequent ear ache in EHS?

[02:57:19.130] - **Dr Belpomme**
Well, probably because those patients use their cell phones more than MCS patients, which accounts for their EHS and also sleep disturbances and a tendency to have depressions, depression tendency. As far as MCS patients are concerned, we find more eye issues and more hear issues and this is related to MCS which is actually an illness which affects the upper respiratory tract. And we find more anxiety or panic in MCS patients. There are commonalities between both. But in terms of symptoms there are small differences, subtle differences. How about combining both what we call the mixed syndrome EHS plus MCS? Well, we have a much larger number of symptoms. We have skin injuries and these are clear, objective symptoms. We have 46% of skin injuries when patients have both EHS and MCS against 5% in MCS patients. But there are things that can only be seen when you examine the patient. So, balance disturbances, imbalance issues, balance disorders and we've also identified a crippling ictus which is paralytic ictus. Well, these ladies become paralyzed all of a sudden. They are totally paralyzed and one limb or two limbs are suddenly paralyzed and the paralysis disappears a little while afterwards.

[02:59:45.170] - **Dr Belpomme**
It's what I call paralytic ictis. This is typical of EHS, only it also occurs when EHS is associated with MCS. There is more confusion when the syndrome is the mixed syndrome. There is more sleep disturbance and ear, nose, throat issues. So, the symptoms are much wider and much stronger when both pathologies are associated.
Next slide, please. These are the kind of injuries skin rashes that appear in 45% of the cases of EHS and EHS MCS patients. You cannot deny that these symptoms are frequent and objective. WHO is aware of that? They are aware that EHS is not something, it's not some kind of mental illness or imaginary illness. It is a medical condition just like any other one. We have spoken about biomarkers, of course. There was a meeting that bring together more than 30 specialists in the field of electrohypersensitivity who co-signed this consensus-based article. In order to make a medical diagnosis you need biomarkers and in order a biomarker does not need that. There is a neurological diagnosis. The only thing you do is the diagnosis of a certain biological condition that can lead to the diagnosis of the illness.

[03:01:58.080] - **Dr Belpomme**
So, the biomarkers we're going to skip vitamin D histamine is a marker because it increases in more than 40% of the cases just like migraine or headaches. So IGE not significant. But the protein s 00 B. Intensive care unit physicians kept shown that there is an infection in the brain. There is a brain trauma. It is an examination that is carried out in an emergency case when there is a cranial trauma. So nitrogen oxidative stress is also a clear marker and it shows the opening of the brain blood barrier and also HSP 27 and or HSP 70 which are markers of cell stress, cellular stress. These markers are very high in certain cases. And certain patients also show a total immune response by the increase of the secretion of the anti myelin p zero, which is a protein of autoantibodies against that oppose this protein myelin surround nerve cells and it shows that there is an autoimmune response in those patients. There is also a decrease of the hydroxylation in sulfate. There is less hydroxylation

sulfate in 80% of the cases, while in 10% of the cases, it actually increases. But we don't know the reason for that increase.

[03:03:56.500] - **Dr Belpomme**
Is it a hyperproduction under the effect of electromagnetic fields or under the effect of certain chemicals because it is secreted by the pineal gland? Now we are stepping into a field of biology that should enable us to better understand the syndrome biomarkers. In between 14 and 24% of the cases, we have not found markers. So, the markers are not an exhaustive, a comprehensive solution to everything.
Next slide. This is what happens in the different patterns EHS and MCS. 14% to 24% of patients do not have markers. And all of a sudden there is 1,2,3,4, markers. The higher the number of markers, the lower the ratio of patients with those markers. But it matches the very definition of marker in carcinogenicity.
Next slide. So, we talk about tests. Their specificity no markers are nonspecific. The markers we've used are nonspecific because they can be found in other pathologies. So, there is no specificity. But it just means it only means that we need other criteria to be able to describe or to identify specifically the illness sensitivity. In 14% to 24% of the cases, there were no markers. So this is no solution. Neither reproducibility.

[03:06:15.720] - **Dr Belpomme**
They were reproducible in the same laboratory. But we are waiting for other people to carry out this kind of test in other laboratories, maybe using other markers.
Next slide. This is very important. This was said by Mrs. Stein. There is a research team that is currently publishing their results. No ordinary MRI is going to be helpful, only the functional MRI. But there are very few centers where that kind of MRI is carried out. So other radiological investigation methods have to be used, like the transcranial doppler ultrasonic technique. It's confirmed in a number of cases that there were issues with the medial brain artery. So, we have an objective characteristic that proves that this is a true pathology. And we have used the encephalon scans that we spoke about earlier. They show us a very important point. But we also used what the Americans called spec. That is a single photon emission computer tomography technique (PET) and everything. All these methods show that there is something happening in the brains of the patients.
Next slide. So these are the results of the trans Doppler ultrasonography. They show the abnormalities. This is very important. It is a criticized examination and the College of Physicians in France is attacking me for that.

[03:08:41.620] - **Dr Belpomme**
But this examination is very important because it specifically locates the abnormalities in the brain of EHS patients. So on the left hand side you have a normal patient, a normal person, and on the right-hand side, an EHS patient. There is a French patent on this technique, but it's taken over in the United States in order to increase the quick means of investigation investigating those patients. When you see the blue columns, there is a drop in tissue pulsing. So, on the left it's the right hemisphere of the brain. On the right hand side it's the left hemisphere of the brain. What we can see is that in the capsulothalamic region of the brain, between the capsule and the thalamus, the thalamus is the center of sensitivity. There is a pulse utility pulse deficit and this examination is 100% through that examination. So, it is an approach that really helps differentiate EHS patient from a normal subject. So I'm really

trying now to rehabilitate reinstate this kind of examination, which was much criticized in France, which is still much criticized. We can hear located the abnormal abnormality and there is injury in the limbic system. This is clearly shown here by a functional MRI brain scan.

[03:11:20.500] - **Dr Belpomme**
I was included in the hypothesis section of this meeting. It might have been a better idea to include me in the evidence section, but never mind. We have objective arguments that show without any doubt that there are areas that are lit up at rest. It's called a modular network deficit DMN abnormal default Mode network. So we're working on concrete evidence. Next slide the same here SPECT there are abnormalities which are very visible. They have nothing to do with this shows that EHS has nothing to do with an imaginary disease. Now, is EHS related to electromagnetic fields? Well, we have fact-based arguments. We have evidence that is strong enough that the relationship between EHS and electromagnetic fields is very likely. We reject the idea of a psychiatric or psychosomatic theory. There are so many such theories around. We know that MCS is recognized at the international level as a somatic condition. If in 25% of the cases, EHS is associated with MCS, it can be psychological.

[03:13:44.100] - **Dr Belpomme**
So we need to work in a very rigorous way, strict way, and we should not provide philosophy around EHS. Then I believe it is obvious that thanks to our markers we have been able to highlight a change with the **BBB** inflammation, the opening of the blood brain barrier (**BBB**), et cetera, et cetera. Everything has been demonstrated in animals and this is clearly linked to an exposure to EMFs. So, in human beings we have lesions and biological changes that correspond to what we have observed in animals and that was related to EMFs for animals. So this is an indirect link and from a chronological point of view, EHS appeared following the adoption of artificial sources of EMFs, WiFi, etc, wireless technologies, which means that from a chronological point of view. We have a pathology that did not exist a century ago and it does exist now, following the introduction of these wireless communications and these man-made EMFs. And again, this is not limited to one region. It's all over the planet. We have WiFi everywhere. And this change happened at the same time in all countries and we can see that everywhere. So, do you believe that this could be a special effect related to psychological or epigenetic elements? No, of course.

[03:15:42.460] - **Dr Belpomme**
Now, of course the nocebo effect is possible in some patients, but you need to establish a distinction between the causes and the psychological effects. Then we also have challenging studies that were developed with healthy volunteers. And I asked my colleague Philippe Hack to find negative studies. Apart from the Belgian study, there were no negative studies. They are all in favour of this fact that there is a link with EMFs. And of course, this is something that we published and this needs to be taken into account. It's not one study, it's dozens of studies. So, when we're saying that we do not have enough studies and that we haven't been able to make progress, it's not really true we have made progress, but what we lack today is a synthesis of all publications and we need to be brave enough to look at what has been published. Now, of course we need to look for these publications. And then finally, I would like to say that there are epidemiological studies that show that because of EMFs you can have the same symptoms as for sensitivity tests with sleep disorders, for example, and then you have suicide.

And all of these elements have been demonstrated in epidemiological studies. You can find that information in that kind of publication. And then I'd like to try and conclude if you look at the medical history of patients, you will see.

[03:17:59.220] - **Dr Belpomme**
Same types of exposure to electromagnetic fields, adults, young people, you will see that there is this exposure in their medical history. So, I really wanted to insist on the vision we have and we should not only focus on questionnaires then I'll skip the other points. Sorry, I can't read, but yes, EMFs cause lesions and Dimitri has told us about other effects, about molecules and these are genetic facts. But you know, this is very complicated because it can be genetic epigenetic or another phenomenon. Biology is something that is very complicated. You need to be a biologist to understand. And I believe that in front of me, we have a person who understands the problem and sees where the problem lies. But all of these findings are not absolute facts. But this publication was analyzed by a reading committee and it is considered has a highly probable hypothesis. So, I believe it is important to reassure the EHS patients because we are making progress. Maybe one last point. I have many other things I wanted to share with you. But I would like to tell you.

[03:19:58.400] - **Dr Belpomme**
That in 10% of the cases MCS actually precede the occurrence of EHS. So, there might be a chemical cause that appeared before the occurrence of electrohypersensitivity. And that's where I sometimes disagree with what we can see in scientific literature. Because EHS should be defined as it is the case for MCS as a lowering of the tolerance threshold to EMFs. And for MCS it is related to the threshold related to the exposure of chemical products. So, in my view, MCS and EHS are part of the same neurological disorder. Then as to the WHO and what they recognize about EHS as being related to EMFs, everything is mentioned. They're talking about the threshold, the limit of exposure. And I believe it is important to make a distinction between the IEI EMF (???) from EHS. That's very important.

Next slide. And of course, I'm at your disposal during our discussion if you have other questions. Yes, this slide. Why should we abandon the psychogenic and psychosomatic theories for EHS causality? I just addressed an article. It was published, it is online now. And I read in English psychogenic or psychosomatic symptoms do not mean causality. That's very clear. It's not because you have psychogenic or psychosomatic symptoms that you have a cause.

[03:22:20.220] - **Dr Belpomme**
Not at all. You have to find the cause of that psychosomatic symptom. So people who say that this is only a psychogenic problem do not understand the problem. Then you have objective psychopathological changes with the nitro oxidative stress in EHS patients. We wrote an article about this. So that's very clear. It's not specific, but this is a possible explanation, as it was highlighted by Dimitri earlier. It has a role to play in the mechanism, but it is not the only issue. Okay, I have to stop here, so I'll stop here. But of course, it doesn't mean that there is no nocebo effect that actually can be added to the cause related to chemical products and electromagnetic fields. Of course, nocebo effect is always possible. That's the Pavlov reflex. We cannot question that. But if you have a nocebo effect, it's

because you have a cause. There is no nocebo effect if there is no cause. So, this does not exclude the causality for EHS and MCS. Thank you.

[03:23:53.560] - **Maria Rivasi - Dr Belpmmme Q&A Kluas Buchner**

We did some study of S 100 B. A long-term study for people who first were not irradiated at all. And later, after one and a half years only very low doses, about highest was 100 microwatts per square meter. (Note ICNIRP member of the public limit about 10,000,000 microwatts per square meter). We did see an increase, even with this little irradiation, an increase of S 100 B. Not very big, statistically questionable. But what I want to say, maybe at least this parameter is not a marker for electrohypersensibility, but just for much radiation. Double the full exposition.

[03:24:56.800] - **Dr Belpomme Q&A**
Well, for the exposure you need to talk about the dose, but also about the duration of exposure. That's very important. That was clearly demonstrated by a German researcher. Second comment that's the main confusion there is in many people, the markers we use enable us to contribute to the diagnosis, but there is no immediate link with the notion of Aetiology that is , he exposure to EMFs. It is possible to see an increase, but that's not proof. That's not demonstrating that EMFs are actually the cause. But I do not know whether this answers your question. Now, there are many other causes other than EMFs can be the cause for the increase in the S 100 B protein values.

[03:26:04.430] - **Dr Belpomme Q&A Dariusz Leszczynski**

Yes, I have some problem with those biomarkers because, as Dominic Belpomme just mentioned, there is not really, in his opinion, a direct correlation between those biomarkers and exposures to EMF. And this is the problem. All those biomarkers which are being used were not tested and examined in humans to be shown that they are increasing or declining after exposure to EMF. The only thing that is being done is that person is coming to laboratory saying that I am EHS. And then this panel of tests is performed and it is linked. Okay. You are, EHS, you say that you are EHS. You have those biomarkers increased or declining in different way. So these are biomarkers for EHS, whereas they are not because they are biomarkers for possibly variety of different stress response within the body that can be caused by different factors. And at this moment, there is no proof that there is any connection between those examined biomarkers and EMF exposures because it was not tested. Dominic Belpomme doesn't do any EMF exposures. For him to classify somebody as EHS person is that this person tells I am self-diagnosed EHS person. So this is the missing link.

[03:28:13.930] - **Dariusz Leszczynski**
Are those biomarkers in persons who are claiming to be EHS related somehow to EMF exposures? Or simply there are people with failing health coming to laboratory. They have health problems, they have variety of biomarkers affected. We can test them and say, yes, those people who have increased or decline in those different so-called biomarkers are persons who have health problem. But is it caused by EMF exposures or not? We don't

know. And therefore saying that those biomarkers are biomarkers of EHS is incorrect or at least premature. Now.

[03:29:18.300] - **Dr Belpomme Q&A**
Confusion about the notion of biomarkers. And maybe, dear Darius, you did not really understand what is really a biomarker in medicine because as I said, the biomarkers that are used are not aetiology biomarkers, which means that we do not establish a link between the biomarkers and the exposure to electromagnetic fields. However, what cannot be denied is that when we study EHS, we do not prejudge on aetiology. We consider that EHS is a medical entity and at that point in time, biomarkers have a role to play to pose the medical diagnosis of the condition. And the confusion comes from the fact that you establish a link between EHS and the exposure to EMF. But as I said, this was not demonstrated. There are indirect elements that say that there is a link between the two. But for the moment, we have to consider EHS as a medical condition, and that's it. Whatever the cause, it could be chemical products or EMF. That's the medical reasoning we should adopt. And when we use these biomarkers to pose a diagnosis, it's not to pose an etiological diagnosis. There is a clear distinction between the etiological diagnosis and the medical diagnosis because, for aetiological diagnosis, we use other means.

[03:31:15.160] - **Maria Rivasi comment**
Yes. If I may, I'm going to take over the power because we're supposed to finish our meeting at 06:30. And there is a last panel looking at the health policies that we should adopt and develop. I believe it is important for us to discuss this issue and we need to bear in mind the purpose and the objective of this workshop. I believe it is important to have different positions, different views about this phenomenon. Now, I heard your presentations. You talked about some biomarkers that cannot be considered as a stamp or a proof that we have EHS. And then you have a wide range of symptoms for EHS. Yes. To be clear, these biomarkers are the biomarkers of one condition. Whatever the aetiology, these are not biomarkers showing the exposure to electromagnetic fields. And this is something that should be highlighted very clearly. Yes. Another comment, 30 seconds.

Dr. Rafaelovich
This is a methodology that is not the same for a researcher, a decision maker or a physician. Dr. Belpomme told us about the medical approach. If someone comes to see me because he has a stomach ache, am I going to refer that patient to a surgeon? Well, first I'm going to see where the pain comes from.

[03:32:56.430] - **Dr. Rafaelovich**
I'm going to push on the stomach. I'm going to ask many questions, and with each question, the quality of my diagnosis will increase because I do not want to send the patient to the surgeon for nothing. But then I do not want to miss an acute problem if that patient has appendicitis, for example. So, this is only one step of the diagnosis, the biomarkers. Now we're going to talk about public health, and that's very important, of course, but I'm sorry, because public health is in the hands of people who are not working at the service of patients. We should have clinicians because we want people to be healthy. And this is something that we can do. We can make sure that they're healthy. So the diagnosis approach is not the same as an approach that is there to understand the theory and to make

progress in research. Yes. What I also wanted to say is that medicine is making progress and evolving. And I was telling you about future tests, the tests of the future. I believe that tomorrow those tests. Will come to confirm the purely clinical approach that anybody can follow and adopt today.

[03:34:31.220] - **Dimitri Panagopoulos Q&A Comment**
Just a comment, I believe the work of just one comment. I believe the work of Dr. Belponmme and Dr. Irigarai on objective biomarkers is extremely valuable. The people who are suffering from this condition, they are in need of this kind of work. They need objective biomarkers. And there was a positive comment of Dariusz Leszczynski that he said that we have to connect these biomarkers with EMF exposure in this direction. There were also some very important provocation studies and one example is the McCarthy at all 2011 study in which Andrew Marino participated. This is an example provocation study and this provocation study used ELFs, used low-frequency exposure, electromagnetic exposure and they saw that the patient who claimed that the patient was EHS was responding to the exposure and not to the non-exposure periods. And they even showed that pulsing the field had even stronger effect, which is in line with my theory that the pulsing fields are more bioactive than the same fields when they are non-pulsed. Also, there are some biomarkers that they were examined by the group of Belpomme and Irigaray that for example, oxidative stress, which is found in 97% of the studies with EMF exposures by Yakimenko studies, Yakimenko papers they have shown that 97% of studies that examined oxidative stress in different biological systems that were exposed to electromagnetic fields, they showed they indeed showed oxidative stress.

[03:36:57.550] - **Dimitri Panagopoulos Q&A Comment**
And also there are studies that they have showed that the blood-brain barrier is opening irregularly, is destroyed, is disrupted after EMF exposure. So these are all indications that they are in support of certain biomarkers used by the group of Belpomme, Irigaray. And I believe that all these should be connected all these indications should be connected in order to have a more complete assessment. Thank you very much.

[03:37:32.860] - **Maria Rivasi comment**
Yes, I'm very, very sorry. I'm terribly sorry. Of course, if we still have some time afterwards we can discuss this but I would like to hand over now to Mr. Dimitro fornia and Mr. Bookner because time flies. But I think it's really interesting to have this discussion about the models. But the state of science is the state of science. You have models, patterns, discussions and this is how we actually make progress in science.

[03:38:02.650] - **D Fornea**
You have the floor very much for invitation and I am happy as member of European Economic and Social Committee to have the opportunity to hear all these arguments. We did two opinion on these aspects, but not on necessary on electromagnetic heaper sensibility. We did on the digital identity and all the technologies which is related with the proliferation of this electronic communication devices and also the societal and ecological impact of the 5G ecosystem. The time is very short. We will just want to tell you that we have one statement in our opinion which was based on experience of our members which they consider the EHS as an illness and of course was complicated today to find out the

proofs in this statement. In many interviews that we had with a member of civil society organizations, they said that they want a reconnaissance of this affection to be like a disease, like an illness. And this is not very clear now in our legal framework. So now what we have to decide and that is very interesting because we have various points of view. We have from one side the factual basis proof that we need in order to have a political decision in this sense and was said by Mr. Leszczynski, this kind of mark biomarkers with this kind of proof. Mr. Belpomme has described the entire mechanism and the information which gather during its experience and of course some of the processes which are very hard to be seen with bare eyes and needs more investigation in our member states and I think openness from the society and scientific environments in order to understand all this argument. And Mr. Panagopoulos has also described factually we can say what happened with some phenomenon in this field, with this pulsatory effect, stroboscopic effect, multiplexation all this has been discussed and all the information that we have in the field are from whistle blowers. That is the problem. Nobody has discussed this openly with us, but it's important that the academic environment because you have to decide on interdisciplinary and to support the European Parliament and we as a representative of civil society organizations, we need these proofs in order to debate and to have a political response on this disease. We had these debates before and we said here and we highly appreciate Madame Rivasi because it's a little bit how to say it's foreseeing what can happen in a certain field. We had the same debate with the asbestos, for example.

[03:41:10.810] - **D Fornea**
Nobody recognized it at that moment that we might have problems and was a lot of defense. And we had the same problem with the Teflon, with Dupont and other companies, which has been involved. So with the time can appear if has started this discussion, I think it's good. In the aviation (cockpit pilots) we discussed in the post we have the just culture principle. Whether it's a problem, you have to report it and the person is taking seriously into account. We have in the working condition for aviation, for our trade union we negotiated this principle. We have recognized the professional affections in Bill Bao for those which are working under this electromagnetic field, for example, the rail engine, the mechanics from railways, some people which are working in aviation, the cockpit pilots and all some of categories which they are recognized as professional disease. So why not in the moment we will have more and more information and we will design better because this is not an anti-technology discussion. It's only about how to improve the design. How you can improve the deployment of the technology which is obvious very useful. We are using this.

[03:42:33.390] - **D Fornea**
But if we have claims from the citizens, even if it's one citizen, we have to take them into account and to process these claims. And based on the precautionary principle which this group agrees in, the Parliament is very careful with them. I fight with them sometimes on the mining industry because they defended also in the sign I use in the gold mining industry, for example, we had big debates here and big discussions. So I think we don't have to see it as a war. We have to see it as a necessary step in advancing in a humanity progress with this technology, using friendly the technology but also at the same time not damaging the environment, not damaging the human life and the life of animals and beings which are around us. We have to be aware and awaken. That is the message and we are ready to support and we get already with Romanian organizations they are calling themselves Top 5G

but they are engineers. Don't imagine that they are mystical. They are engineers wishblower from the telecommunication industry and they provide us with a lot of information and with a request to start to work on this path because lots are to come.

[03:43:49.050] - **D Fornea**
Imagine only what will happen with the electromobility when you'll have an entire battery under your ass and you will travel with that. Imagine what will happen with the deployment, massive deployment of this technology, with the AI or Tactile internet or other applications which are very interesting but not always necessary or they can be can work in the control environment. Thank you very much,

[03:45:06.340] - **Mr Klaus Buchner**
Has made it clear it is not sufficient to do something for the EHS people. We generally have to lower the limits in order to avoid EHS. I think that's a very important thing. So there are several attempts we have discussed big legal procedures in the US and we have to know that in the US the situation is different. Please have the

next yes, in the US we have the possibility that we can attack a legislation as such in Europe we first have to be aware of the fact that it's not an affair of the European legislation, it's national legislation. And here we can in principle force the member states to lower the limits because we already know ICNIRP limits which we apply now are not sufficient, but one way we usually do not realize that in Europe the local authorities have much, many possibilities for regional planning and they use it very seldom. We have to enforce this point very much. Next slide, please. How can we do it? The situation, in my opinion, has improved very much in the last years because we have to apply the precautionary principle. But we are already beyond that.

[03:47:11.330] - **Mr Klaus Buchner**
We have some political statements or politically valuable statements which we can apply for legal actions. So, I just remember the statement of the Committee on Social and Economical Affairs I don't remember the precise name where each EHS is acknowledged as an illness. So that is very important for legal procedures. But in order to push this through, we have to combine many groups. Here there are some mentioned in this slide. There's a new association of scientists and separated from this, also an association of lawyers. And I think it's very important that these two groups more or less combine. There is one lawsuit in Brussels attacking generally the limits, which I think is not so effective.
The next slide, please. I think it's more effective to use the neighbourhood legislation because there you have not to prove in general that something happens with electromagnetic radiation. It's sufficient to prove an individual damage, damage which has not to have a very high level. And I want to remind you that the European Court of Human Rights has published a paper last year giving conditions for applying this neighbourhood rights. And this is very helpful for us. As I said, it's sufficient that you have one person who has a medically acknowledged disadvantage.

[03:49:35.100] - **Mr Klaus Buchner**
I say disadvantage, not real illness.

The next slide, please. And this has been published in the official Journal of the European Union. Here is the reference. And we are trying to do this in Germany in a lawsuit. We have a group of people near a base station in the main radiation direction of the base station and we have no EHS people among them, but some objective criteria like heartbeats variability and other things. So, we can prove that these people have personal disadvantages, also reaction tests and so on. And this makes me optimistic. I think courts cannot deny these personal disadvantages. So, I want to conclude with a very optimistic view by having several such court cases where we use neighbourhood laws. Then we have to change the national legislation. And with this, I hope that we can have some hope in this situation. Thank you very much.

[03:51:18.940] - **Maria Rivasi comment**
This has been a most interesting intervention because there are several fields of action. There is the scientific field. Well, it's up to you to do your job. We need better diagnosis to be able to precisely identify who's got EHS and who doesn't have EHS. So, it's also important that people should understand whether or not they are EHS. So that's the first step to identify determine whether these people are EHS. Or not. But then the next step is how to help these people. And I'm happy to hear that there are people who are looking for refuge or trying to offer refuge to these people once they've been diagnosed. What do diagnose, what do these people do if they remain in a place which is electromagnetically polluted? They cannot live anymore. They are discriminated against. They have to try and protect themselves all the time. It's a hell of a life to be EHS, and we should not forget about that. So it's up to the scientists to find markers, better diagnosis methods, and then it is up to us politicians to find places for them, safe havens for them. And our goal should be to help them move from EHS, their EHS condition to a normal life.

[03:52:59.050] - **Maria Rivasi comment**
There are people who have done that and they've been able to find places almost without electromagnetic fields. But there is help. We should be able to help these people lead normal lives. There have been many studies you have mentioned STOA, which is an office similar to OPEC in France, where there are MPs from different political tendencies, where independent studies can be carried out. And it has been shown that electromagnetic fields have biological effects, physiological effects. That's been shown. And there well, the lowest possible levels have to be found But what I entirely agree on is that we have to fight against a huge lobby, the whole industrial military lobby, the telecommunications lobbies, and they lobby the Commission, the European Commission, to make sure that us MP's are not allowed to express our opinions against giving money to industrials. You know, for example, that the Commission is going to give €900 million to finance the 6G. Now, nobody knows exactly what it is. There has been no study about the health impact of 6G. So all these fields are well, many of these fields are actually beyond our control. That's why I've found your intervention particularly interesting.

[03:54:54.500] - **Maria Rivasi comment**
So how can we successfully oppose that military and industrial lobby, the mobile phone operators lobby a commission? How can we oppose a commission who only thinks in terms of digitalization and who only thinks that the future is only that? So, we're struggling to make sure that justice is done, that there is justice because we're not even able to vote on

opinions that go against the grain. So, we will have to undertake court cases and at least find out if citizens agree, the citizens agree to have on our streets completely autonomous vehicles, completely connected cities; at least we need to make sure there is some kind of European sovereignty on industrial patents. So, what is urgent, in my opinion, still in relation with those lobbies is, well, we should urgently work on the position of the WHO. We need to organize a meeting with the WHO scientists and politicians to tell them you have to work on that because it is urgent. It is urgent because there is a lobby which is already telling the WHO. You said that electromagnetic fields were probably carcinogenic. Well, you need to remove that.

[03:56:45.140] - **Maria Rivasi comment**
That goes against the very goal of the who, the reason for their existence. So we need to interfere with that. I was telling you earlier about Monsanto when the International Center of Research Against Cancer said Glyphosate is carcinogenic, and all the agencies in the USA, FSA, in Europe, everywhere, they said, no, it's not carcinogenic. Well, it was through legal actions. I met the American farmer who won the lawsuit against Monsanto, and he won €75 million. It was thanks to our justice system that we could bring out to the light, the Monsanto papers, and we could demonstrate that all the scientists who were carrying out studies were paid by Monsanto. Well, here we are facing the same kind of situation with electromagnetic fields. They are so strong, they are so powerful, they are so rich that they're able to pay scientists to make them lie. Either they lie or they lose their jobs and their funding. And these operators are now short-circuiting the democratic system. They are directly lobbying the commission. And what do we do now? So, the only solution now is the courts, the trade unions, the courts. We should go through the courts, use the courts to win our case.

[03:58:27.590] - **Maria Rivasi comment**
But this will consume a lot of renewable energy. So, what I suggest, if you agree, because we should really keep in touch, is that we should seek an urgent meeting with the WHO because they can play their role. They are corrupt. You may say they are corrupt and so on, but we should try anyway. We should also meet the people of the International Agency for Research into Cancer (IARC) because they have to be aware of our existence. They have to be aware that there are studies that have been carried out and that they cannot shift position just like that, for no reason at all. Now fighting for the recognition of EHS, of course. But if people say, keep saying, well, electromagnetic fields are not carcinogenic anymore, well, it means we can't do anything anymore. We become powerless. So, we should do what is urgent first, take a few urgent steps. Before anything else,

Dr Belpomme
I would like to add something to what has been said. I entirely agree with the person who said that EHS has to be considered to be a medical condition without any bias in terms of aetiology, whether it comes from electromagnetic fields, it stems from electromagnetic fields or chemicals.

It's easier for WHO to recognize an illness than to recognize that an illness is caused by something specific. So first, the recognition of the illness. Now, there are two very important words adaptation and prevention. What is suggested to EHS right now, for lack of any better

solution, what we can do is adaptation, provide white areas, areas without Yemen, but that is not prevention. Prevention means removing the true causes. Of course, the emergency is adaptation, but a deeper action should go into the realm of prevention. Now, you should not believe that being a scientist is easy. You just throw the ball in the court of the scientists. Well, you just manage, you find a solution. You find a solution for diagnosis, for everything. That's not how things are done. There are as many divisions among scientists than among politicians. So, what I'm trying to do now, what I've always been trying to do, is bring together the different scientists who work on medical aspects and bring them together, make them join forces and try to make them speak with one voice in the international scientific community. Another point is that well, there is a book you should read and ask you to please read it.

[04:02:07.960] - **Dr Belpomme comment**
Thomas Kun is the author. It was written several years ago. It is called: the structure of the scientific revolution. It means that electrohypersensitivity is not as simple. We need physicians; we need biologists, we need physicists, we need physicians, we need biologists, we need politicians and lawyers. So medical conditions are to be described by physicians. Scientists have to describe the effects of electromagnetic fields and so on. So, scientists should get together, should join forces and I will wind up by saying that we need the courts, we need the intervention of justice to win lawsuits. But in order to win lawsuits, you need robust scientific data. A lawyer cannot fight for a cause without any scientific basis. If scientists appear before the court, the court being divided about EHS, and we will not win the case because we will give weapons to our opponents. So, scientists should join forces, that's one thing. And then the WHO, we have been working on the WHO. We set up a scientific committee with all sorts of brilliant people. But the WHO is not easy going because 50% of the funding of the WHO comes from operators and industrials. So, we fall back into the lobby issue.

[04:04:09.440] - **Dr Belpomme comment**
So we need a consensus-based meeting about electromagnetic fields and electrosensitivity hypersensitivity. We need to have that again, as it was done in Atlanta 1999, about MCS. So, we had some work to do. And in that consensus-based meeting we really need high-level scientists, not politicians, not EHS patients, really well-known scientists, well known for their work and their knowledge in the field of hypersensitivity. We can work together to organize that meeting, but we need funding. I can provide all the scientists you need, Americans and all the nationalities you wish for. But do you have the money to organize that kind of meeting? Because the WHO will not give us a cent. But given that they didn't have such a consensus meeting for the last 15 years and they are outdated, they have not taken into account the current research.

[04:05:46.640] - **Maria Rivasi and another commentator**
Another comment? Yes, thank you. Thank you, professor? Yes. I believe that WHO already clearly recognized MCS. Yes, because yes, they recognize MCS, but not EHS. Yes, but if they recognized the MCS, they must recognize EHS, because I won a legal case. They went to the home of the patient and that was based on the recognition made by WHO. So, I believe that this is a card that we must use and who cannot avoid recognizing EHS. But as you said, this is a process and it will be time-consuming, but it is important. You talked about the threshold

that needs to be reduced for EHS and MCS. For EHS, you talked about brain imaging. You said that the zones were visible. But I would like to know, in terms of the pathology, whether this is irreversible or not. But I believe that the struggle has already started on the basis of the recognition of MCS by the WHO.

Dr Belpomme comment
Yes, this question of irreversibility is an important question, and we have looked into it. It would mean that the disorder and the condition could disappear in some patients, especially if they are treated at an early stage.

[04:07:26.500] - **Dr Belpomme comment**
Now, indeed, about the who, you said that they recognized MCS. It was a difficult process, but you are right, they recognized MCS, but they haven't recognized the fact that MCS is related to EHS. That's why we need to go on with our research and our studies, and they need to be validated by WHO.

Maria Rivasi
All right. These will be the very last words of our meeting today. I would like to thank you very much for being with us today. I would like to tell you that we're going to support you. We're going to fight for EHS patients because if we are here, it's for you, it's for all these people who are suffering. And we really need to find a way to cure them, to find solutions so that they can lead a better life. So, we have many struggles to lead from a legal point of view, from a legislative point of view. We have lawyers in the room. I believe you have a lot on your plate. And then, of course, we need to make sure that scientists can find a consensus to move ahead and financial means. Now we'll try to see in the field of research how we can help and make a contribution and try to avoid all conflicts of interest because Horizon 2020 is providing a lot of money for health and environmental issues.

[04:09:03.970] - **Maria Rivasi**

But it's always the same people who get the money, and they do not have the clean groups, if I may say, compared to the research they want to develop. So thank you to all of you. And I would also like to thank the interpreters. interpreters would like to thank you too. Thank you very much and have a safe journey back home and I wish you all the best. Stay