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Panel for the Future of Science and Technology – Workshop on 5G
Presentation by Dr. Rodney Croft,
Chair of ICNIRP answers three questions
For the European Parliament
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Begins at 10:13:14
Time markings are approximate.

Can you hear me now? Hello? Wonderful, okay. Ah, look. Before I start, uh, I should just respond briefly, uh. It was stated uh, in, uh, by one of the chairs…that there was a report that found that ICNIRP had conflicts of interest and that the guidelines were co-written by industry organizations. Neither of these is true.
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Okay. Now. What I'd like to do is start off with **question one** and before that is, Good morning and thank you very much for the invitation to join you all here today.
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First of all is the risk assessment adequate? Well, yes. The ICNIRP 2020 risk assessment is a robust and reliable document for protective policy-making. It represents the outcome of many thousands of scientific papers synthesized by a range of competent and independent international scientific agencies. Importantly, it was developed as an iterative process of scientific and public consultation, insuring that all arguments were incorporated into the version. Where good reasons were provided for change, this was, of course, incorporated into the risk assessment.
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However, where changes were requested without any good reasons being provided, it, of course, would not have been useful to make such changes.
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The obvious question that arises though is, how can we have such confidence given that there have been claims that specific studies have provided evidence that RF causes harm below the ICNIRP restrictions.
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?? …briefer then is required to explain the complexity or the necessity complexity of the scientific method adequately. But hopefully, an example will help show you why this apparent contradiction arises.
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An important point is that a study reporting that there is an effect of RF on health is not evidence that RF affects health. Now, why is this?
It's because science is not set up to ensure that every research outcome is correct. Science is set up so that even if the methods and how it was conducted was perfect, statistics need to be used that are deliberately designed to lead to false conclusions 5% of the time.

Of course, in addition to the statistics there are a range of methodological issues that increase or decrease the adequacy of the findings.
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And in addition, there is a complete and separate issue which is how the results are interpreted. As a result of this, it is very uncommon for a particular study to provide evidence of anything.
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And so, scientific evaluations must consider the research ??? as a whole, looking for consistency across studies, patterns within a study and so on.
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Research publications, of course, do make such claims that they have solved all the problems of the world, but this is not justifiable. This is obvious, of course, when we remember that two different studies that report opposite effects cannot both be right. It reminds us that the methods must be more complex than we would have liked.
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Now, that National Toxicology Program's rat study is a good example of this. It's a study that has been talked about a lot as evidence that RF causes cancer. And if we focus on just one aspect of this, we can see the difficulty associated of relying on claims made by a single study.
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This aspect concerns chance. Given that most health-related end points are highly variable even if we don't treat animals with RF exposure at all, when we obtain measures of health from the two groups of animals we will get somewhat different numbers. As I said, even if neither was exposed to an agent such as RF, the difference is due to normal variation.
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Hence, statistics are used to determine whether differences between the groups is random or due to a systematic difference between the groups, such as one of them being exposed to RF.
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Statistics provide a probability value which tells us how likely it is that the difference was actually related to the treatment, or in this case, the RF exposure. Normally, if the probability is less than 5%, we say that the treatment had an effect.
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However, as more comparisons are made, the probability values become less and less meaningful. For example, if we conducted 14 statistical tests, the chance of getting a result with an apparent probability of 5% would actually be 50%, or no more unusual than tossing a coin and getting a heads. There would not be a difference between the sham and the RF exposed in that case – even if the probability that was reported was less than 5%.
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In the NTP study over 10,000 such tests were conducted, which means that the study was not able to test any hypotheses at all, as was pointed out from the statistics review from the NTP process. As such, the study can only be used for suggesting possibilities that future research would need to test. And indeed, there are now studies being conducted in both South Korea and Japan that are dealing with the NTP limitations and testing the hypothesis that RF is indeed carcinogenic.
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In itself, though, the NTP rat study cannot be considered evidence of carcinogenicity. So, although there are clearly papers that make claims about adverse health effects of low level radiation, they represent only pieces of the puzzle. And it is the overall evaluation that is crucial for determining which of the claims are consistent with the truth.
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Although there are reviews that synthesize various scientific papers to provide a summary of the state of play, most of the real work gets done as part of the scientific process itself, whereby claims are tested, weaknesses addressed, and conclusions empirically derived from new data.
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However, I should add that in terms of ecology or the environment it is important to note that this is not addressed by the ICNIRP risk assessment. We are aware that there are some interesting interactions between low level electromagnetics, uh, electromagnetic fields, I should say, and behavior in some species. But we do not believe that there is enough understanding where this might be sufficient to effect ecology or the environment, and so, the scope of the guidelines was deliberately restricted to human health.
This doesn't mean that there is evidence that RF adversely affects ecology or the environment, but rather, given the highly variable quality of the research, and given that there is no clear indication that ecology or the environment, as opposed to particular animals, are 10:20:59 adversely affected by RF exposure, we believe that there was not sufficient data with which to base restrictions. This is an area that ICNIRP is currently looking into.
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The second question (posed by the moderator) is much simpler to answer. The ICNIRP – worry, I should, as we haven't gone through them yet, **the second question is, are the recommended exposure limits for RF, which are based mainly on short-term tissue heating effects, sufficiently protective to avoid harm from lower level longer-term exposures that are below the ICNIRP limits?**
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Now, it's important to note that the ICNIRP exposure limits protect against all adverse health effects to humans. They are not limited to short-term effects, nor are they limited to particular interaction mechanisms, such as heating.
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The ICNIRP restrictions have been derived from the lowest exposure levels that have been shown to cause any adverse health effects, regardless of both interaction mechanism and exposure duration.
The adverse health effects at the lowest levels just happen to be caused by heating, which is why some people mistakenly assume that only thermal effects are protected against by the limits.
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To be clear, science has not identified any adverse health effects associated with exposures below the ICNIRP restriction, regardless of exposure duration, and regardless of whether the interaction mechanics is thermal or non-thermal.
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The third question is, is there enough independent research into the health and environmental (effects) of 5G, which would help to reassure the public, and help minimize future liabilities?

Well, that's described earlier. There is a wealth in independent research that shows that 5G will not cause hazardous exposures. However, it has been suggested by some that by virtue of the fact that 5G is new there must not be enough science whether it poses a health risk.

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It's important to be aware, though, that 5G is only a new transmission protocol using the same physical agent as current technologies, that is, radiofrequency fields, or RF. And it is this physical agent that's important for health. RF electromagnetic fields are one of the most thoroughly researched physical agents in our world.

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And the knowledge concerning its interaction with the body is substantial. Of particular importance is that the mechanisms of interaction between RF and the body are known, including how this is affected by frequency. Such knowledge has been incorporated into the ICNRP guidelines, providing protection specifically for the higher frequencies relevant to 5G technologies.

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The only positive justification that I've heard from people recommending more research is that 5G uses higher frequencies than either 3G or 4G.

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However, as the effective frequency of interaction between RF and the body is already known, it is difficult to understand why more research would be useful.

Over the last 30 years there have certainly been those that have claimed that every possible permutation of RF exposure needs to be researched in depth. And indeed, science has looked for differential effects as a function of pulse modulation, for very specific frequencies, and even for window effects, where there were claims that harm occurred at very low levels but not at high levels.

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However, science has failed to find anything that couldn't be explained by its existing mechanistic knowledge, which is a great demonstration of the adequacy of our current knowledge. It's also important to be aware that it's impossible to look at every exposure permutation, no matter how long society spends on the task.

We can point out that although 920.1 MHz has been studied, we need to study 920.11, MHz 920.111 MHz, etc. But these possibilities are literally endless, particularly when you consider that there are also interactions

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Of frequency with pulsed modulation, time, power, and all the differences that exist between people. This is not something that is special about the RF field. This is something that occurs in all science.

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And science uses the method of induction specifically for this reason. It extends our knowledge beyond particular cases to general laws. So, the issue is not whether there is a specific study that has yet to be conducted, but rather whether there is reason to believe that science's

method of induction should not work (10:25:56) in this particular case, and accordingly, why we can't rely on science's strong understanding of how RF effects the body.
But given that the only difference between 4G and 5G is that some 5G technologies will use higher frequencies, and given that the effect of frequencies already (is) understood, we can be very confident that 5G within the ICNIRP limits will be just as safe as previous technologies.
So, with that I'd like to thank you for your attention. I realize that uh there was a lot of detail in it. But I think it crucial that we can consider that detail in order to truly move ahead with this important discussion. Thank you.
10:26:28 (end)