



# **The urgent need to apply the ICRP criteria to Non Ionizing Radiation**

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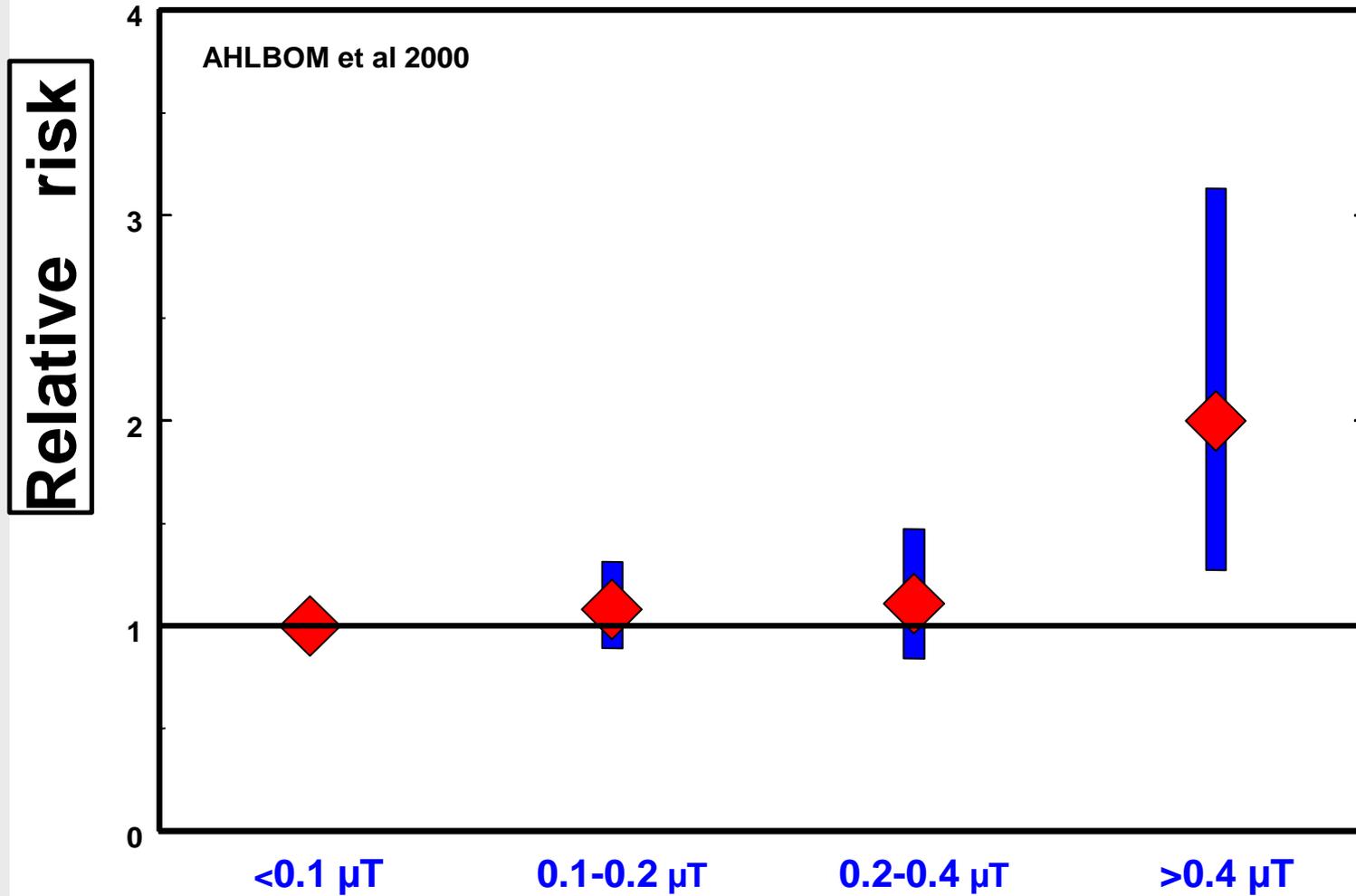
# The current state of knowledge on health and EMF

- *Association between ELF-EMF and childhood leukemia*
- *Pooled analyses of data from well-conducted studies (2001) show a consistent association between a residential ELF exposure above 0.4 microTesla that doubling the risk of childhood leukaemia (IARC).*
- *According with IARC criteria ELF - EMF were classified as possibly carcinogenic to humans (2B) based on epidemiological studies of childhood leukaemia )*

# IARC Criteria for classification

		Animals			
		Sufficient	Limited	Inadequate	Suggesting lack
		<b>1 = established</b>			
		<b>2A = probably</b>			
		<b>2B = possibly</b>			
		<b>3 = unclassifiable</b>			
		<b>4 = probably not</b>			
Humans	Sufficient	1	1	1	1
	Limited	2A (1)	2B (2A)	2B (2A)	2B (2A)
	Inadequate	2B (1, 2A, 3)	3 (2B)	3	3 (4)
	Suggesting lack	3 (1)	3	3	4

# Ahlbom et al 2000



# The current state of knowledge on health and EMF

- *After this review of IARC, other studies were performed, in exposed personnel of the Swiss, Norwegian and Swedish railways, with the same conclusions of the IARC study.*
- *But to support a “causal hypothesis” of EMF-ELF it was necessary to determine the existence of some biological mechanism of carcinogenesis initiated by ELF-EMF.*
- *That was the reason of the REFLEX project*

# The *REFLEX* project

- *in vitro* studies using the most modern molecular biological techniques such as: genomics and proteomics.
- The *REFLEX* project was developed in 12 research institutes and universities in Europe exposing to EMF different types of tissues and cells of human and animals.

# **The *REFLEX* project Results**

- ***Both, EMF-ELF and EMF-RF can produce damage at exposure levels below the limits recommended by the ICNIRP.***
- ***The data strongly indicate a clastogenic potential of intermittent electromagnetic fields, which may lead to considerable chromosomal damage in dividing cells.***

# **The *REFLEX* project Results**

***Genetic damage is varied and the observed effects are equivalent to those produced by ionizing radiation:***

- ***chromosomal aberrations,***
- ***single and double break of DNA strands***
- ***the appearance of binucleated cells, micronuclei and comet assay***
- ***changes in the expression of genes***

# **The *REFLEX* project Results**

***The effects were clearly more pronounced in cells from older donors, which could show that DNA repair efficiency decrease with age.***

***An important conclusion of the *REFLEX* project is that many tissues were sensitive only to EMF discontinuous, allowing to explain the existence of positive and negative studies in the bibliography***

# ***REFLEX Project Conclusions***

***Taken together, the results of the REFLEX Proj. were exclusively obtained in in vitro studies and therefore, not suitable for the conclusion that ELF-EMF exposure below safety limits causes a risk to the health of people..,***

***They move, however, such an assumption nearer into the range of the possible.***

***Furthermore, there exists no justification anymore to claim, that we are not aware of any patho-physiological mechanisms which could be the basis for the development of functional disturbances and any kind of chronic diseases in animal and man.***

# The Interphone study

*The biggest epidemiological survey carried out on mobile phone users.*

*Partial results published on May 2010 by IARC, point the profound disagreement between the different teams of researchers over the interpretation of these results.*

*Study coordinator, Ms Elisabeth Cardis, summed up a kind of compromise saying that: the study did not reveal an increased risk, but one could not conclude that there was no risk, because there were sufficient results suggesting a possible risk.*

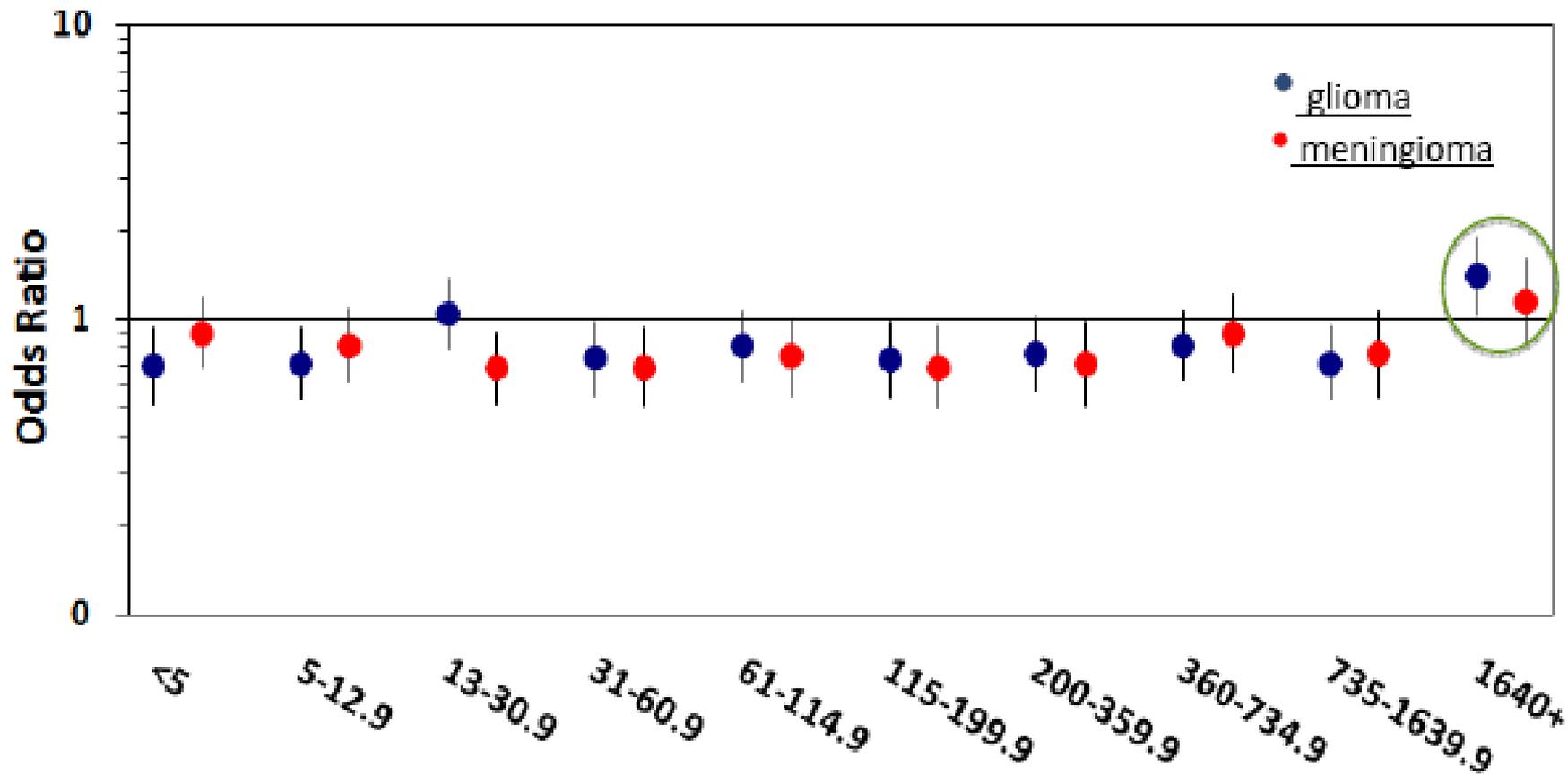
# Interphone study Results

*For shorter periods, less than 10 years, there is no increase of risk..*

*The upper decile that includes the more intensive users and for the longest period shows significantly increased risks for glioma  $RO=1.4$  and meningioma  $RO = 1.16$*

*Some studies of ipsilateral use shows 96% of increase for the same side, that means the glioma has appeared more at the side of the head to which the telephone was held*

# CUMULATIVE TIME OF USE (HOURS)



Seminario ITU - Buenos Aires, Argentina, 16-17 December 2010



# **Interphone study main conclusions**

*The International Agency for Research on Cancer (IARC) has classified RF-EMF as possibly carcinogenic to humans (Group 2B), based on an increased risk for glioma, a malignant type of brain cancer, associated with wireless phone use...*

# IARC Criteria for classification

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## Comments:

*It's probably too short 10 years to reach conclusive results given the period of latency and growth of cerebral tumors.*

*Interphone did not include children and adolescents although it is known that they receive more SAR for the same exposure.*

*The majority of subjects were not heavy mobile phone users by today's standards.*

*The median lifetime cumulative call time was to about a half-hour per day.*

# Applied criteria for protection

The Precaution Principle establishes that “when an activity represents a threat for human health or the environment, it is necessary to take measurements of precaution even when it could not have demonstrated the cause-effect relationship in a scientific and conclusive form”.

Precautionary Principle are applied just in the cases of possible but unproven adverse health effects and where action is deemed necessary to protect people.

That's exactly the situation in the case of EMF

***Precaution Principle are technically feasible, practically possible and economically acceptable***

***It's the approach used by the Swiss authority (814,710)***

***Was applied successfully for more than 12 years***

***Objective is to design constraints as technically feasible, practically possible and economically acceptable.***

***“waiver request” are always available***

***It's apply only in the so-called “sensitive sites”***

***Exposure of population in Switzerland remains ALARA***

***Reinforce exposure levels recommended by ICNIRP.***

**The ICRP system was structured with the three principles that remains valid for any kind of risk :  
justification, optimization and limitation**

***The ICNIRP system remains in the principle of limitation***

***The exposure limits are found in the thermal effects***

***ICNIRP not recommend to apply de Precaution Criteria***

***The ICNIRP object the use of any constraints.***

***ICNIRP president states:***

***Restrictions are based on science***

***Precautionary measures are not alternative to  
science-based standard***

- ***The president of ICNIRP stated “the use of other values arising from the optimization “Tends to increase public concern rather than reducing worries and controversies and tends to create confusion and mistrust of the science, and in the authorities”.***
- ***This position of the ICNIRP probably arises from the confusion between the use of limitation values and “the constraints” arising from the implementation of an optimization process.***
- ***Many recommendations on children protection are released by several organizations including the European Parliament, not by ICNIRP***

## AND THIS ANTENNA?

In Geneva

Over the  
**WHO Headquarters**  
Building



Seminario ITU - Buenos Aires, Argentina, 16-17 December 2010



This slide seems more appropriate for promotion

# **An agreement between the ICRP and ICNIRP for the protection criteria is very important to avoid conflicts of causality**

- *The effects on human and animal cells are the same*  
*Then in the case of mixed fields is not possible to determine the source of damage.*
- *A new approach presented in IRPA XII considers that mechanisms of breaking the barrier of a cell as key feature of carcinogenesis, particularly leukemia*
- *Sinergia phenomens are postulated.*



**Thanks..!**  
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