

2B: possibly carcinogenic to humans! A communication challenge

Peter Wiedemann

Karlsruhe Institute of Technology

WF EMF – Science Forum EMF

Motto

One of the greatest challenges facing any public health agency is that of risk communication.

Hamburg & Sharfstein, N Engl J Med 2009°

Issue

Public understanding of the 2B classification of RF EMF emissions from cell phones

- What does 2B mean?
 - Impact on concern and behaviour?
-



The starting point

IARC press release

- The WHO/International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields 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.
- The Working Group did not quantitate the risk; however, one study of past cell phone use (up to the year 2004), showed a **40% increased risk for gliomas** in the highest category of heavy users (reported average: 30 minutes per day over a 10-year period).

IARC press release

- The WHO/International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields 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.
- The Working Group did not quantitate the **risk**; however, one study of past cell phone use (up to the year 2004), showed a **40% increased risk for gliomas** in the highest category of heavy users (reported average: 30 minutes per day over a 10-year period).

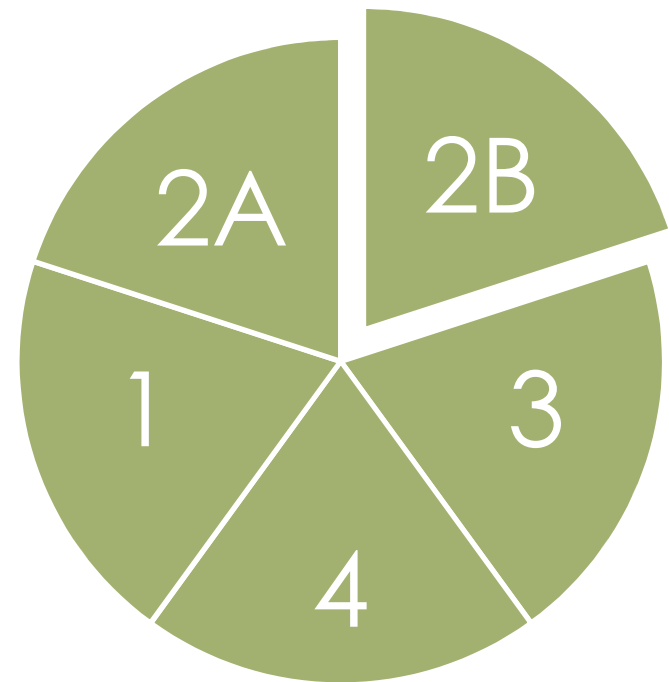


IARC system



A quick look at the IARC system

- Group 1: Carcinogenic to humans
- Group 2A: Probably carcinogenic to humans
- Group 2B: Possibly carcinogenic to humans
- Group 3: Not classifiable as to its carcinogenicity to humans
- Group 4: Probably not carcinogenic to human



The purpose of the IARC system

- ▣ IARC classifies the strength of evidence for carcinogenicity
 - ▣ Differentiates among various levels of evidence
 - ▣ (Provides orientation for action)
-

Group 1

'carcinogenic to humans'

(highest risk)

includes anything for which strong evidence of an increased risk of cancer in humans, and a plausible mechanism, exists

examples: tobacco, alcohol, asbestos

Group 1

'carcinogenic to humans'

(highest risk)

includes anything for which strong evidence of an increased risk of cancer in humans, and a plausible mechanism, exists

examples: tobacco, alcohol, asbestos

Group 2A

'probably carcinogenic'

limited evidence in humans but strong evidence of an increased risk of cancer from animal studies, where the mechanism in humans is likely to be similar

examples: diesel engine exhaust, hot mate

Group 1

'carcinogenic to humans'

(highest risk)

includes anything for which strong evidence of an increased risk of cancer in humans, and a plausible mechanism, exists

examples: tobacco, alcohol, asbestos

Group 2A

'probably carcinogenic'

limited evidence in humans but strong evidence of an increased risk of cancer from animal studies, where the mechanism in humans is likely to be similar

examples: diesel engine exhaust, hot mate

Group 2B

'possibly carcinogenic'

limited evidence of increased risk of cancer in both humans and animals, or evidence only of a potential mechanism

examples: coffee acid, DDT

Group 1

'carcinogenic to humans'

(highest risk)

includes anything for which strong evidence of an increased risk of cancer in humans, and a plausible mechanism, exists

examples: tobacco, alcohol, asbestos

Group 2A

'probably carcinogenic'

limited evidence in humans but strong evidence of an increased risk of cancer from animal studies, where the mechanism in humans is likely to be similar

examples: diesel engine exhaust, hot mate

Group 2B

'possibly carcinogenic'

limited evidence of increased risk of cancer in both humans and animals, or evidence only of a potential mechanism

examples: coffee acid, DDT

Group 3

'not classifiable'

there are currently insufficient scientific studies to assess the likelihood of something causing cancer – often this means that further research is needed

examples: cholesterol, hydrogen peroxide

Group 1

'carcinogenic to humans'

(highest risk)

includes anything for which strong evidence of an increased risk of cancer in humans, and a plausible mechanism, exists

examples: tobacco, alcohol, asbestos

Group 2A

'probably carcinogenic'

limited evidence in humans but strong evidence of an increased risk of cancer from animal studies, where the mechanism in humans is likely to be similar

Examples: diesel engine exhaust, hot mate

Group 2B

'possibly carcinogenic'

limited evidence of increased risk of cancer in both humans and animals, or evidence only of a potential mechanism

examples: coffee acid, DDT

Group 3

'not classifiable'

there are currently insufficient scientific studies to assess the likelihood of something causing cancer – often this means that further research is needed

examples: cholesterol, hydrogen peroxide

Group 4

'probably not carcinogenic'

there is strong evidence to suggest that something does not cause cancer

examples: there is only 1, caprolactam

2B classification features

Group 2B: "The agent (mixture) is *possibly carcinogenic to humans.* "

"The exposure circumstance entails exposures that are possibly carcinogenic to humans.

- This category is used for agents, ...for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence of carcinogenicity in experimental animals.
- It may also be used when there is inadequate evidence of carcinogenicity in humans but there is sufficient evidence of carcinogenicity in experimental animals.
- ...

IARC classification

- The IARC-system is about hazard, not about risk!
- IARC classifies the level of evidence that speaks for a hazard.

„These categories refer only to the strength of the evidence that an exposure is carcinogenic and not to the extent of its carcinogenic activity (potency) nor to the mechanisms involved.“ IARC 2006

What does “limited evidence” mean?

- ▣ Limited evidence – epidemiological studies

A causal interpretation is considered to be credible, but chance, bias or confounding could not be ruled out with reasonable confidence.

Is that beyond reasonable doubt?

The slide features a minimalist design with three horizontal bars in a muted olive-green color. The top bar is a thin line at the top. The middle bar is a thick, solid block that serves as a background for the text. The bottom bar is another thin line near the bottom. The text 'Communication issues' is centered within the thick middle bar in a white, sans-serif font.

Communication issues

Communication challenges

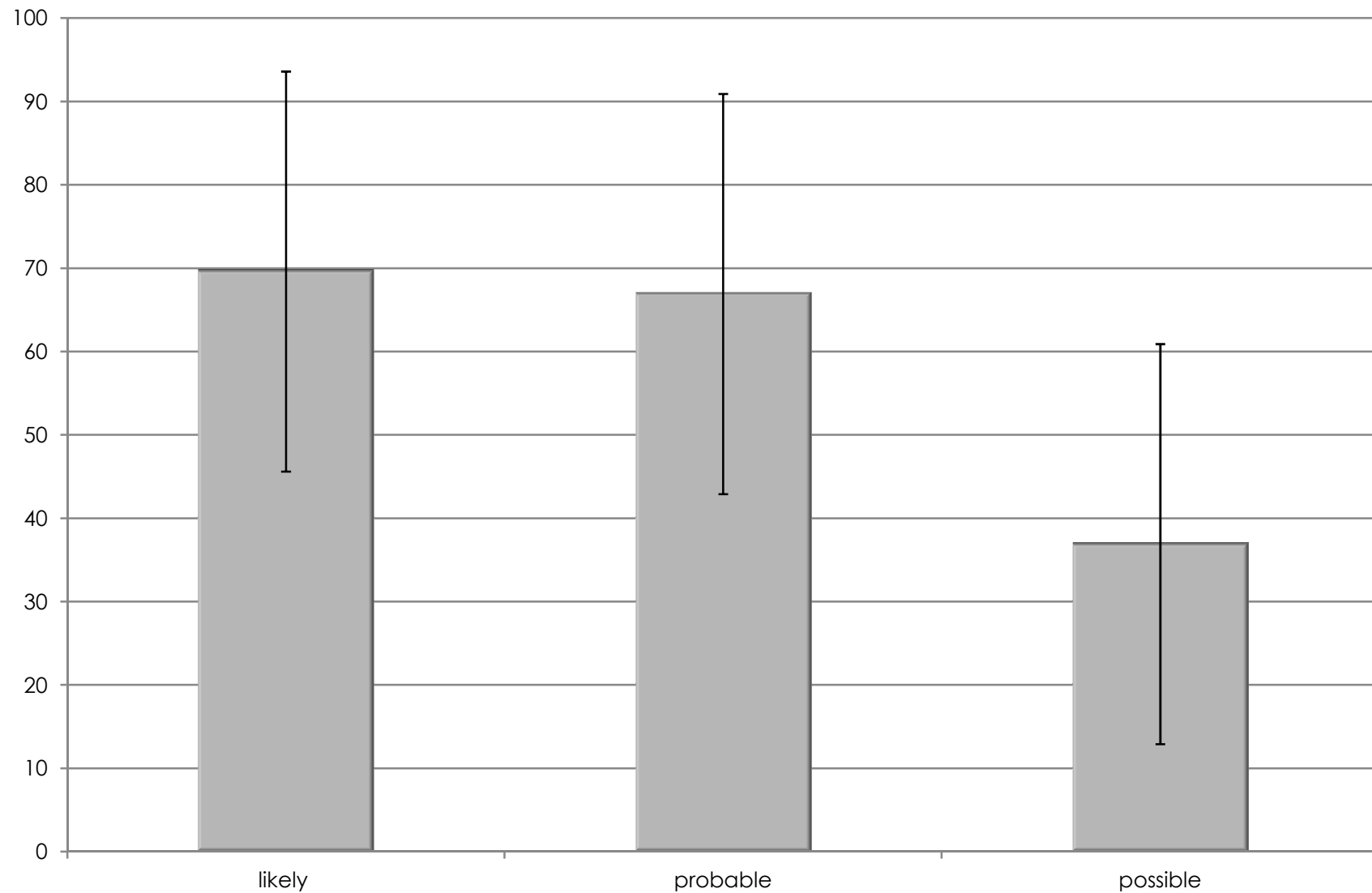
- The overarching aim of RC is supporting proper understanding of the messages
 - Message 1: “Possibly carcinogenic to humans”
 - Message 2 : “40% risk increase of glioma”
 - Enhancing appropriate actions
-

People's understanding of "possibly carcinogenic"

What we have found in qualitative interviews

- High diversity of interpretation
 - is just a hypothesis, risk not predictable, only under certain conditions the case, ..., serious situation
- Tendency to overestimate/underestimate the available evidence
- Confusion in relationship with with 40% increase of risk for glioma
- Uncertainty is attributed to circumstances, long latency period, genetic variability, exposure to other hazards, personality traits and amount of exposure

Means and SD's of how people interpret qualitative probability terms



K. K. Woloshin,; M. T. Ruffin; D. W. Gorenflo, Patients' Interpretation of Qualitative Probability Statements. Arch Fam Med. 1994;3(11):961-966.

Explaining the strength of evidence

- ❑ Do not use the word “risk” in an assessment of hazards.
- ❑ However, if so, then explain the difference between hazard and risk (uncertainty about the existence vs. uncertainty about the magnitude of a risk)
- ❑ Use phrases based on a common word stem with varying modifiers (e.g., word stem: likely; modifiers: very likely, somewhat likely, very unlikely,...)
- ❑ Indicate the argumentation structure (what speaks for and what against the hazard) and describe briefly the sources of uncertainty

People's understanding of 40% risk increase

What we have found in qualitative interviews

- 40% - difficulties to translate into numbers
 - > low numeracy
 - 1 out of 4, 4 out of 10
 - if the risk was in the past 1%, than it is now 1,4%

- -40% of what?
 - 40% more glioma after the introduction of cell phones
 - 40% more glioma in the entire population
 - 40% more glioma in long term /heavy users

40% : What does it mean?

To put this 40% risk increase into context,

Incidence:

- The age-adjusted incidence rate for brain and other CNS tumours is 6.5 per 100,000 men and women per year (based on US data from 2006)
- Gliomas account for about half of all brain tumours; so their age adjusted incidence rate is about 3.25 per 100.000 per year
- A 40% increase in risk would mean an excess of 1.4 per 100.000 or increase from 3.25 to 5 per 100 000 per year

Explaining risk increase

- Use natural frequencies (1 out of 1000)
 - Provide a meaningful risk indicator (life time risk?)
 - Explain the reference case (40% increase in X in comparison with Y)
 - Putting risk increase in context - attributive risk
-

Comparisons might be helpful for understanding the relevance of 2B

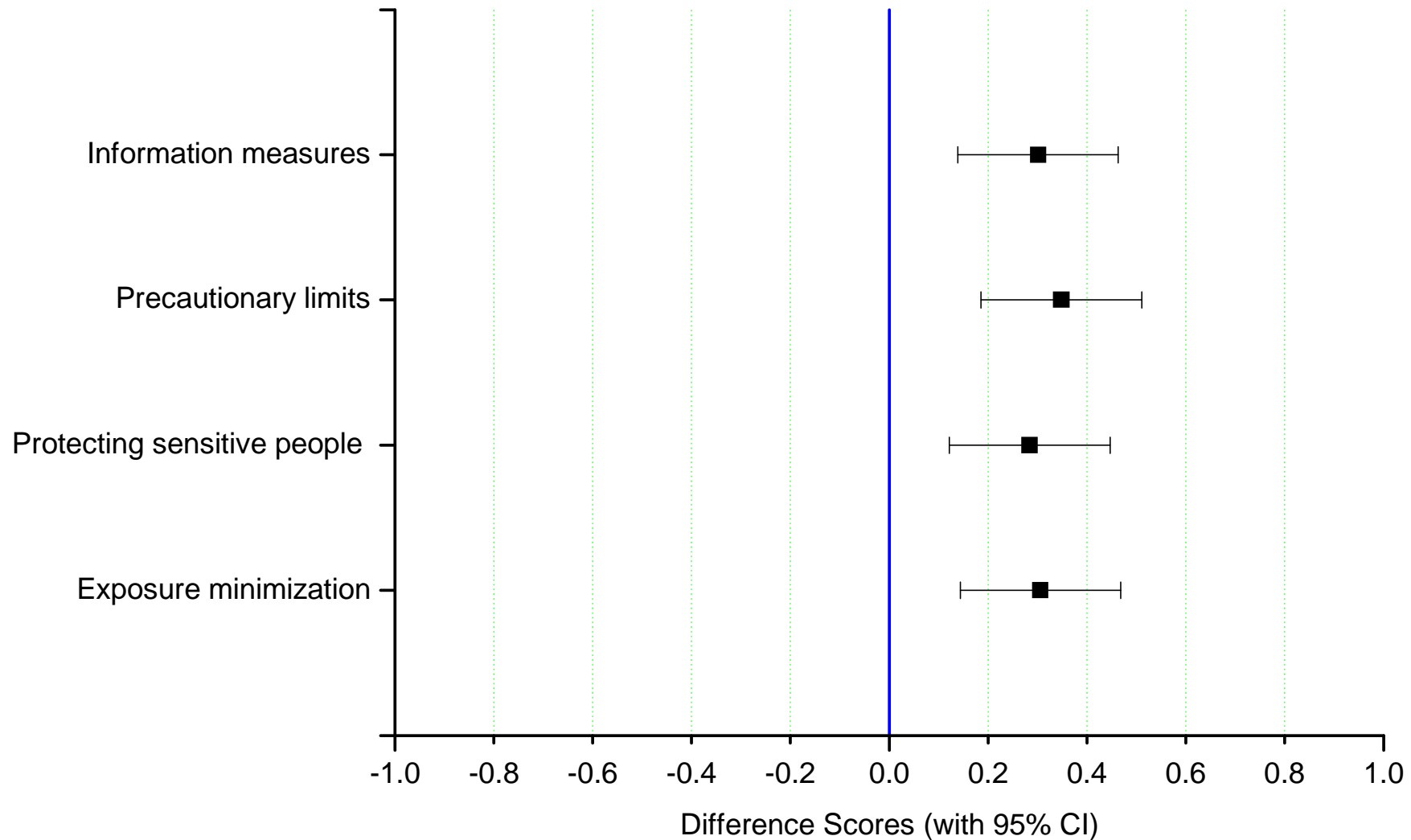
- Two ways:
 - To explain 2B -> giving background information
 - Giving an reference case - another 2B case -> impact depends on the reference case : coffee or DTT

Enhancing actions

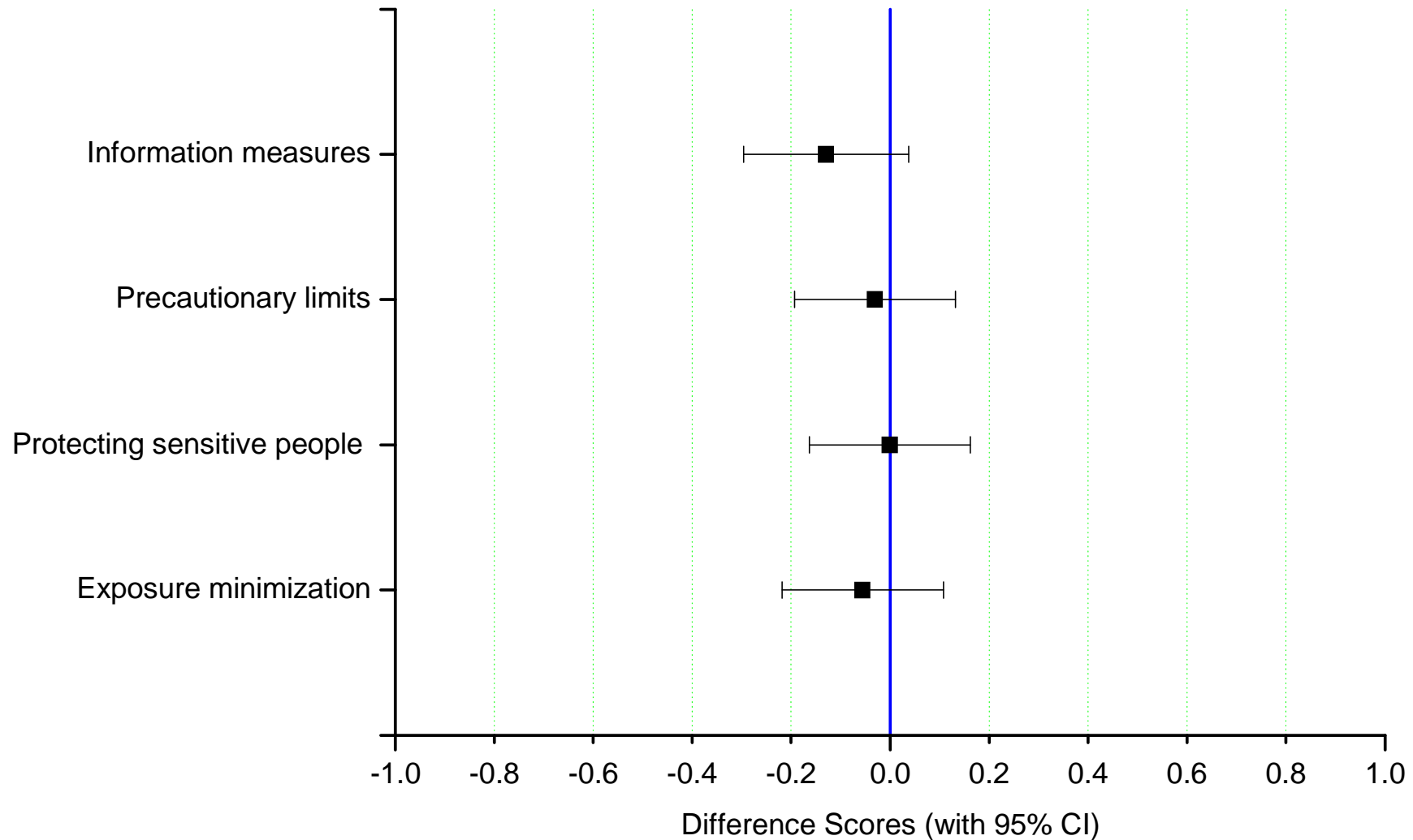
- Many countries take precautionary measures, however what are the effects?
 - Health
 - Risk perception
 - Trust in risk management
-

Country	Info	Position
ANSES (F)	✓	Prior position confirmed: precaution
ARPANSA (AU)	✓	No alarm; but precaution
BAG (CH)	✓	Prior position confirmed: precaution
BfS (GE)	✓	Prior position confirmed: precaution
Dutch Health Council (NL)	✓	Contradicts
FDA (USA)	✓	Contradicts
Health Canada	✓	More precaution
HPA (UK)	✓	Some precaution
SSM (SE)	✓	Precaution
National Health Council (IT)	✓	Precaution, further action needed
STUK (FIN)	✓	Prior position confirmed: Strong precaution

All in all, how threatened do you feel by electromagnetic radiation emissions from cell phones?



Do you trust that the public's health is sufficiently protected against electromagnetic radiation emissions from cell phones?



Enhancing actions

- Informing people about precautionary measures results in increased risk perceptions.
 - Informing people about precautionary measures results does not result in elevated trust in risk management.
 - Therefore, our data demonstrate the need to rethink current approaches to risk communication regarding precautionary measures.
-

Final conclusions

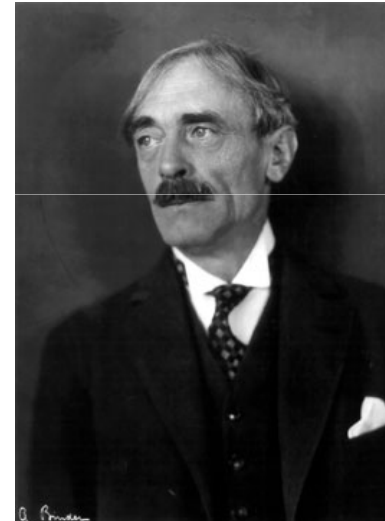
- Hazard assessors should take into account black swans.
 - Public health official should put potential risks into context.
 - Risk communicators should assess the impacts of their messages and select the option with the highest benefit and the lowest countervailing effect.
 - There is plenty of room for improving the 2B communication.
-

Recommendation

- 2B communication
 - Explain the focus of IARC's classification
 - Say what 2B is not
 - Give a comparison
 - 40% increase, if at all addressed, give the baseline information and explain the reference case
 - Address precaution not via "risk perception"! Focus on habits.
-

“What is simple is wrong,
what is complex is useless.”

Paul Valéry



Thank you very much for your attention!

peter.wiedemann@wf-emf.org
