Assessment of Uncertainties and Confidence in Conclusions

The draft report of ICRP TG111

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Presented by
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Guidelines on the consideration of uncertainty

General questions that the working party tried to answer

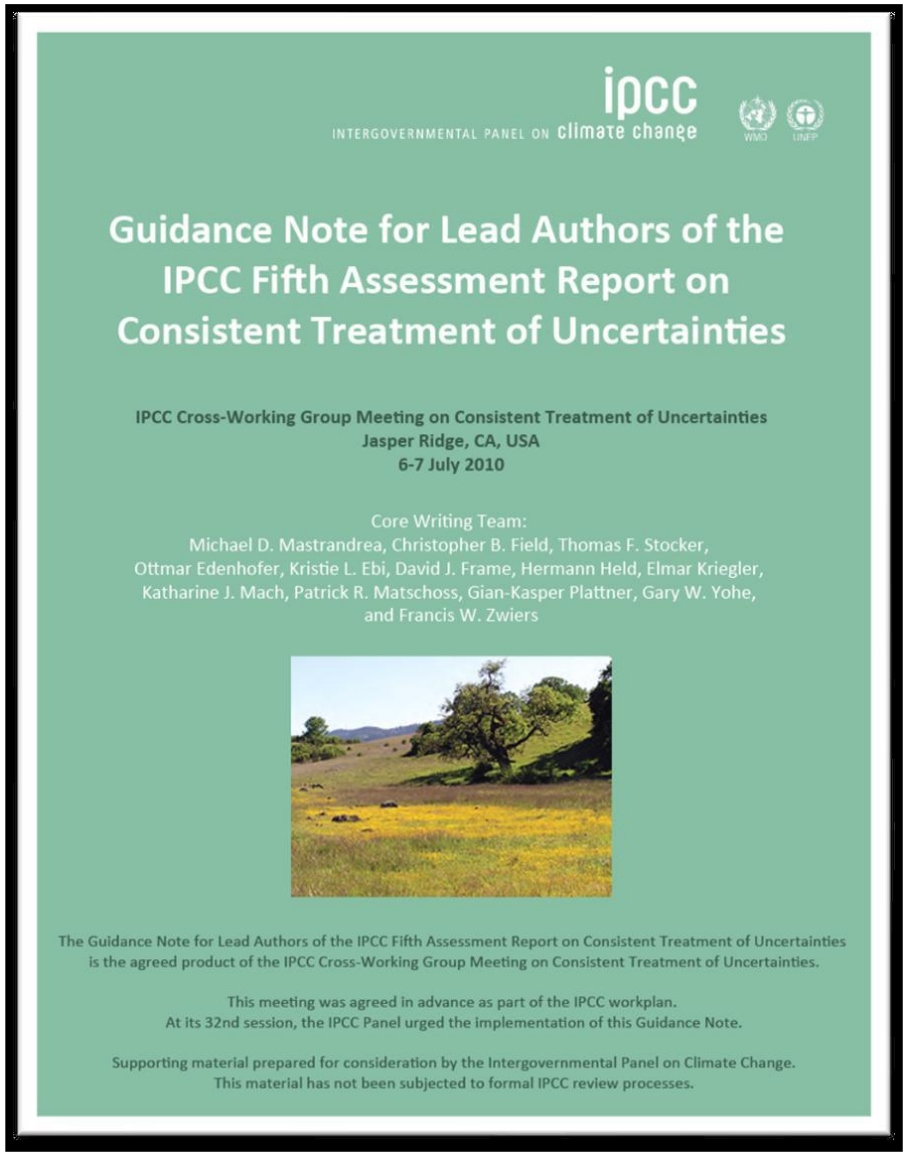
- How to better take into account uncertainties in the System while keeping it **simple**?
- How to improve **transparency** about how we make the best use of current knowledge (science-based vs expert advice)?
- How to improve **communication** about uncertainties and their management within the System?

Chosen approaches

- IPCC matrix
- Powell's principle

IPCC Guideline on the consideration of uncertainty

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP



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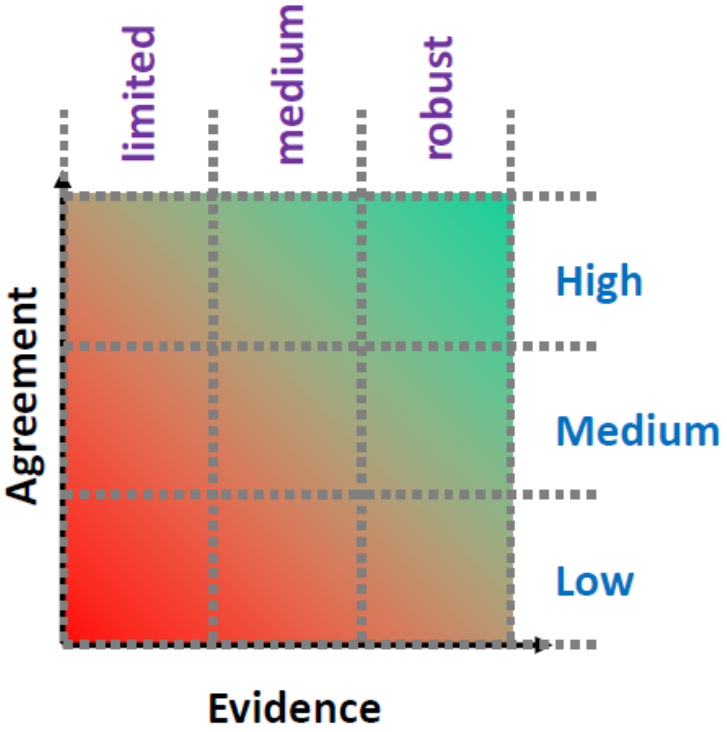
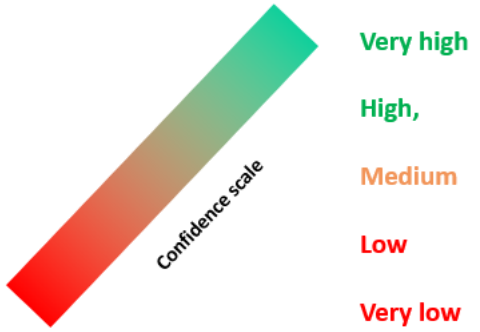
IPCC approach: Evidence, Agreement and Confidence

Evidence: Evidence data and information used in the scientific process to establish findings. In this report, the degree of evidence reflects the amount, quality and consistency of scientific/technical information on which the Lead Authors are basing their findings
Limited, Medium, Robust

Agreement: The degree of agreement within the scientific body of knowledge on a particular finding is assessed based on multiple lines of evidence (e.g., mechanistic understanding, theory, data, models, expert judgement) and expressed qualitatively
High, Medium, Low



Confidence scale: qualitative measure that reflects both the quality of evidence and the level of agreement among experts



Powell´s principle: how to communicate uncertainty

Colin Powell

1. **What we know**
2. **What we don't know**
3. **What we think**

Useful for clarifying value judgements, by separating what is a matter of evaluating scientific evidence from what is a matter of expert opinion

Applies the ethical values of responsibility and transparency

Provides a simple and understandable framework to aid communication in the face of uncertainty

The IPCC approach was used in TG111 and will be presented by Simon

Here is an illustrative example of the use of Powell´s principle (TG119)

Long-term risk of Diseases of the Circulatory System (DCS), Ischemic Heart Disease (IHD) and Cerebrovascular disease (CeVD)

Preliminary content!

What we know

- There is evidence of excess risk of IHD and CeVD with radiation doses above 500 mGy
- There is growing evidence from epidemiology of excess risk of IHD and CeVD under 500 mGy, with no evidence of a threshold
- A relationship is observed with the probability of DCS, but not with the severity of DCS
- There is heterogeneity in the estimated risks between studies and between incidence and mortality data

What we don't know

- The mechanisms of the biological effect of radiation on DCS are not known
- The target organs for radiation-induced effects on DCS are not clearly identified
- Variations of DCS risk between sexes and as a function of time since exposure or dose rate are not well characterized
- The hypothesis of a low-dose threshold cannot be ruled out

What we think

- Recent findings confirm that the risk of DCS must be taken into account in the radiation protection system
- The current classification of DCS as a tissue reaction with a threshold of 500 mGy needs reconsideration
- Calculation of nominal risk coefficients for IHD or CevD cannot be performed with the same level of robustness as for most cancer sites.
- The assessment of risks for CeVD and IHD at low and moderate doses should be based on both scientific knowledge and prudence

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