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# Peer Review and Peer Consultation – Aren't they the same thing?

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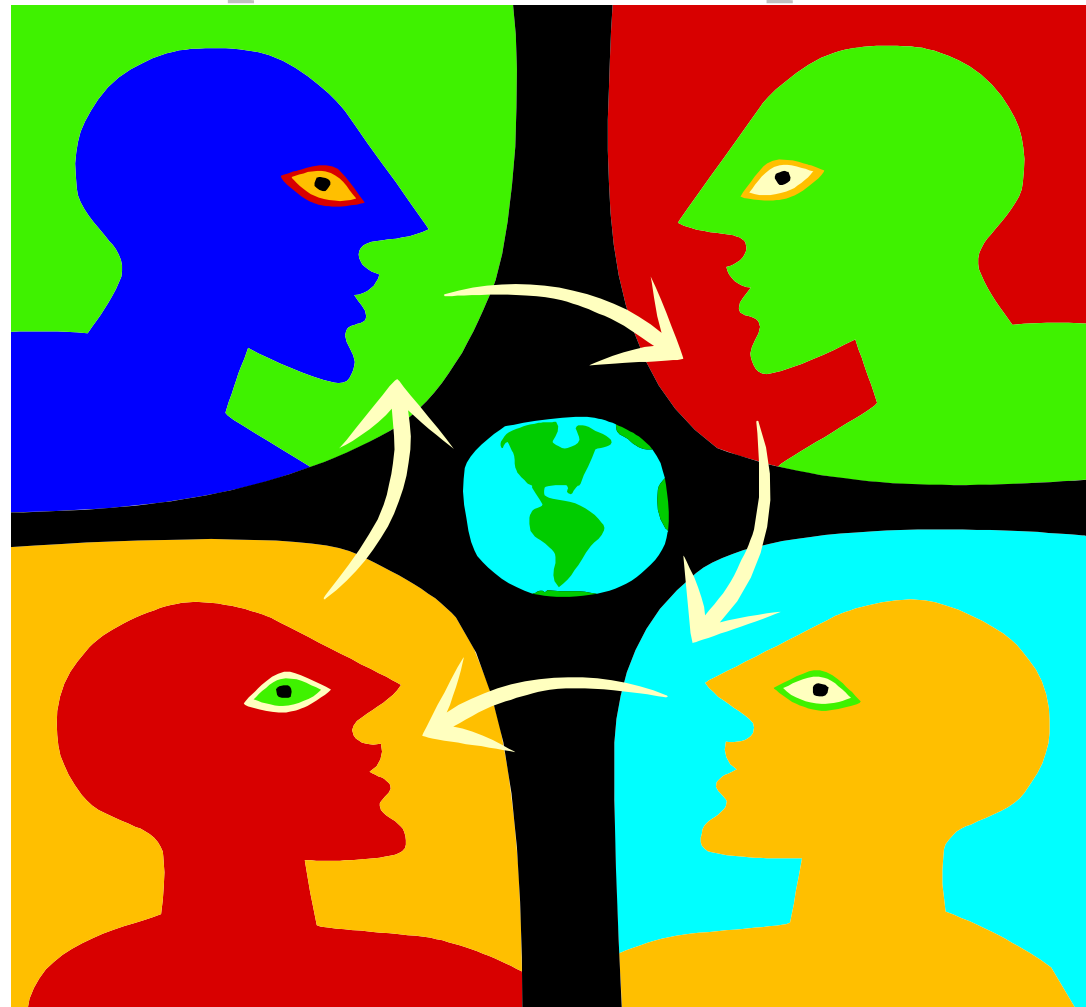
# **Peer Review and Peer Consultation – Aren't they the same thing?**

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## **ABSTRACT**

Peer review of scientific papers submitted for journal publication has provided a system for judging the merit of scientific endeavors for many years. Over the past several years, peer review has seen increasing use to evaluate the scientific basis for regulations and public policies. Most expert peer reviews have a number of features in common, including highly qualified scientists with expertise to evaluate the product, clear instructions to reviewers, and reviewer independence from the authors or sponsors of the work. More recently, additional ways to solicit expert advice have been developed, including peer consultation and expert elicitation. This poster will explore current practices in peer review, peer consultation, and expert elicitation as they are used in the field of risk assessment. The similarities and differences among these approaches, in their goals and objectives, procedures used, and results, will be described. The value of each of these approaches in various settings and for different types of work products will be discussed. This work has been funded in part by the U.S. EPA (cooperative agreement X-82916801); however, the views expressed in this poster are those of the authors and do not represent the views of the funding agency.

# Peer Consultation, Peer Review, and Expert Elicitation: Opinions of Experts



# Background

Peer review has long been used in the sciences to judge the quality of papers for publication, as well as proposals for funding of projects. In the past several decades there has been pressure brought upon government regulators to allow outside experts to review the scientific basis underlying environmental and human health decisions. This led the **U.S. Office of Management and Budget (OMB)** to issue the “Final Information Quality Bulletin for Peer Review” in 2004. This OMB bulletin provides guidance to federal agencies on the types of government science documents and information subject to external peer review and how those peer reviews should be conducted. This bulletin applies minimal requirements for federal agencies to conduct peer review of scientific information and analyses that support federal regulatory decisions. Flexibility is provided in how the peer reviews can be conducted, with stricter requirements for highly influential scientific assessments.

The **Presidential/Congressional Commission on Risk Assessment and Risk Management** in its 1997 report notes the critical importance of peer review in regulatory decision-making to “enhance the credibility of agency decision and position and to improve their technical quality” (p. 103).

The **U.S. General Accounting Office** defined this regulatory peer review as the process of review of the scientific or technical merit by competent persons with no unresolved conflicts of interest (GAO, 1999).

# Peer Review

In the field of risk assessment, peer review is a formal science-based process that is traditionally employed after a document is nearly complete, and utilizes independent experts who were not involved in the development of the document. For risk assessment products, it involves an in-depth assessment of the assumptions, calculations, alternate interpretations, methodology, and conclusions. Peer review panels may seek to reach consensus or common agreement regarding the adequacy of the product reviewed. The goal of peer review is endorsement of the work product's conclusions.

## **Beyond (or perhaps before) Peer Review**

Regulatory peer review provides value to the development of sound scientific policy and regulation. Government agencies and policy makers have also benefited from expert advice of scientific advisory committees such as the National Academies of Science, the National Research Council, EPA's Science Advisory Board and Science Advisory Panel, and Federal Advisory Committees formed under FACA. More recently, additional ways to solicit expert advice of scientists on the scientific basis for risk assessment documents have been explored, including peer consultation and expert elicitation.

# Peer Consultation

Peer consultation\* is a developing concept that involves the solicitation of input and advice from experts, usually in an early stage of a work product's development when approaches and analyses may still be under development. The output of a peer consultation is input, advice, and recommendations from the panel members and not endorsement or approval (as would be the case for peer review).

In a peer consultation, experts provide evaluation of the strength and appropriateness of a work product's scientific basis and provide recommendations for improvements. A peer consultation panel provides for interaction between participants, both the panel and authors, and in some cases, members of the public or stakeholders. Peer consultations may involve one meeting or several, in an iterative process.

EPA discusses peer consultation in its Peer Review Handbook (EPA 2000) where it is described as interaction between scientific and technical experts from inside and outside of EPA during the "development of an evolving Agency work product, providing an open exchange of data, insights, and ideas" (p. 11).

\*Other fields use the phrase "peer consultation." For example, in counseling and education peer consultation describes a process in which practitioners give and receive critical and supportive feedback on their performance or methods from other practitioners.

# Expert Elicitation

Expert elicitation is a process used to gather experts' judgments in a specifically-designed formal manner. It is used to answer a question or provide a prediction, while peer review is generally used to validate or endorse a finished or near final product. While peer review seeks consensus of experts, the expert elicitation may analyze the experts' data individually or as a group. Expert judgment is used when experimental data are not sufficient or questions cannot be answered by other means (Meyer and Booker, 1991). Qualified experts are then methodically interviewed individually or within an interactive group. Various quantitative methods (e.g., statistical methods, multivariate analyses, bayesian methods or simulation techniques) are available for combining the experts opinions. In designing elicitation methods one needs an awareness of how people solve problems and the causes of bias.

Expert elicitation has been used in numerous risk assessment efforts: to analyze safety of nuclear power plants, to determine mortality effects from changes in long-term particulate matter exposures, to determine how information on methylene chloride should be used for quantitative risk assessment, to develop probability parameters for food handling practices used as inputs to a FDA food handling model, and to construct a probability tree on biological theories of cancer causation for chloroform.

# Similarities and Commonalities

- **Selection of Experts** – The success of each process hinges on the selection of experts who are qualified through training and experience to offer opinions. Panel members are selected for their relevant training and experience.
- **Focused Questions or Discussion** - Each process involves the gathering of expert opinions through use of questions or discussion, generally in a meeting setting. Expert elicitation uses a very formal set of questions and procedures to often support the statistical combination of opinions. Peer review and consultations utilize a charge document which provides questions to focus the panel's discussion.
- **Expert Independence** - In each process the independence of the experts enhances credibility of the process and results.
- **Documentation** - Each process should be documented, including how panelists were selected, their qualifications, the materials provided to the experts, the charge or list of questions, and a summary of the results of discussions and conclusions.

# Key Differences

- **Goals and Outcomes** – For expert elicitation the goal is to answer a question when data are lacking. Peer consultation seeks to gather input and recommendations on a draft work product from individual experts. Peer review seeks endorsement or validation of a finished product and consensus among the experts.
- **Work Product** – Expert elicitations do not involve a work product *per se*. Peer consultation panels review a draft product that may vary from early to almost final, while peer review panels are reviewing a finished work product (or portion) and the basis for the conclusions in it.
- **Timing** – Expert elicitation would generally be conducted early in development as it is involved development of needed data. Peer consultations would take place before a work product is finalized and peer review seeks review of a near final product.

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