

# Improving risk-cost-benefit analysis

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The effects of new technologies and discoveries—from nuclear power to medical treatments —often must be inferred long before they are experienced, forcing policymakers to rely on risk, cost and benefit analyses when deciding whether to use them.

In the Oct. 30 issue of *Science*, Carnegie Mellon University's Baruch Fischhoff critically examines these analytical methods, considering how they should be used and how they can be abused.

"Used wisely, [analysis](#) can improve the design of a complex project or technology and guide choices between it and other options. Used unwisely, analysis can bias and obscure those choices. Although formal analyses are highly technical, the factors determining their legitimacy are not," said Fischhoff, the Howard Heinz University Professor of Social and Decision Sciences and of Engineering and Public Policy and a member of the National Academy of Medicine.

Fischhoff reviews four kinds of analysis: estimating the risks of a single technology, illustrated with [nuclear power](#); deciding which risks are worse, as seen in U.S. and U.K. governmental programs; determining how to achieve the most benefit for the least risk, considering alternative technologies; and weighing risks and benefits, looking at prescription drugs.

"The science of analysis has often advanced when critics challenged the results of controversial analyses," Fischhoff said. "We now have much better ways of summarizing scientific uncertainty and helping people

sort out conflicting values—for situations where they don't know what they want, as well as not knowing what they can get."

To increase trust in the analysis process, by making it more transparent, and in science, by making it more useful, Fischhoff proposes to improve communication between analyses and those who depend on their work. Drawing on social, behavioral and decisions science research, as well as Fischhoff's own experience with many programs and technologies, the recommendations are designed to make analyses more relevant and their results better understood.

"My hope is to demystify formal analysis so that people affected by a project or technology can better understand its [risks](#), costs and benefits, as well as the uncertainty surrounding those estimates," Fischhoff said.

**More information:** "The realities of risk-cost-benefit analysis" *Science*, [www.sciencemag.org/lookup/doi/ ... 1126/science.aaa6516](http://www.sciencemag.org/lookup/doi/10.1126/science.aaa6516)

Provided by Carnegie Mellon University

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