

Foreword

Risk means different things to different people, and even within the technical realm of statistics it has a multiplicity of meanings. Different dictionaries and encyclopedias define it differently. A common definition found in multiple places on the WWW and elsewhere is that risk is “a potential negative impact to an asset or some characteristic of value that may arise from some present process or future event”. In everyday usage, risk is often used synonymously with the probability or expectation of a (known) loss. Implicitly, for risk to exist, there must be uncertainty about a known quantity or about an event that has an unknown outcome (e.g., see the links in statistics among risk, utility, loss, and decision-making under uncertainty).

Risk plays a strong role in many of today’s most pressing problems such as the protection of privacy, bio-surveillance, and the detection and control of environmental hazards. Statistical notions are inherent in almost all aspects of risk analysis and risk assessment. The *Encyclopedia of Quantitative Risk Analysis and Assessment* brings together a diverse collection of articles dealing with many of these different perspectives of risk and its assessment. Virtually every topic from modern statistical methodology has found its way into the entries ranging from Causation and Confounding, through Bayesian Analysis and Markov Chain Monte Carlo Simulation, Randomized Controlled Trials, Social Networks, and Survival Analysis. Each is examined from the perspective of risk assessment as well as from the perspective of specific health and other hazards, such as those associated with substances such as arsenic, asbestos, and lead, as well as with global warming, ozone depletion, and water pollution. The result is a fascinating collection of articles that spans the field of statistics and its application to human affairs, including work in cognate fields such as epidemiology, ethics, finance, insurance, and the legal theory of toxic torts.

These topics and especially their application to risk assessment cannot be found in a single or even a handful of standard sources, and readers would normally need to consult multiple books and encyclopedias to gain access to authoritative descriptions of the technical topics and their relevance. The Editors of the *Encyclopedia of Quantitative Risk Analysis and Assessment* have assembled a series of entries from distinguished experts on an interlocking set of topics and it should prove to be a major reference in this domain for years to come as members of society collectively attempt to cope with the multiplicity of aspects of risk, its measurement, and its assessment.

Stephen E. Fienberg

Department of Statistics, Machine Learning Department, and Cylab
Carnegie Mellon University
Pittsburgh, PA, USA

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