Pessimistic Modeling and Inference in the Risk Evaluation of Carcinogens

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Abstract

To set standards for exposure to a carcinogen, regulatory agencies employ the benchmark dose (BMD) method to determine the "virtually safe dose" (VSD). They claim that the BMD method is inherently *conservative*. In this talk I address the question of just how conservative it is. The question is particularly crucial in the risk evaluation of carcinogens that have direct or indirect benefits. In such cases, there are real costs associated with VSD that are excessively protective of the public's health.

I'll present insights that come from viewing risk evaluation using the BMD method in the context of modern economic decision theory. In particular, I'll introduce two non-parametric families of pessimistic (optimistic) distributions and show how these provide for a characterization of the current BMD method and for a semi-parametric lower bound on the risk associated with exposure to the VSD. I'll illustrate these results using data used by the EPA in evaluating the carcinogenicity of chronic exposure to bromate in drinking water.