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Bounds for Some Health-Outcome Treatment Effects

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## Title

Individual Results May Vary:

Inequality-Probability Bounds for Some Health-Outcome Treatment Effects

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## Abstract

While many results from the treatment-effect and related literatures are familiar and have been applied productively in health economics evaluations, other potentially useful results from those literatures have had little influence on health economics practice. With the intent of demonstrating the value and use of some of these results in health economics applications, this paper focuses on one particular class of parameters that describe probabilities that one outcome is larger or smaller than other outcomes ("inequality probabilities"). While the properties of such parameters have been explicated in the technical literature, they have scarcely been considered in informing practical questions in health evaluations. This paper shows how such probabilities can be used informatively, and describes how they might be identified or bounded informatively given standard sampling assumptions and information only on marginal distributions of outcomes. The logic of these results and the empirical implementation thereof—sampling, estimation, and inference—are straightforward. Derivations are provided and several health-related applications are presented.

## Key Words

treatment effects

probability bounds

inequality probabilities

## A Chance to Live Longer

Nivolumab—a biological product marketed by Bristol-Myers Squibb (BMS) in the U.S. as Opdivo—has several FDA-approved indications, one being previously treated advanced

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