

“Promotion Bias” in Clinical Research

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Statistical design and analysis are central to regulation and dissemination of information about medical products. Statisticians are major authors of study protocols, analysis plans, and methods and results sections of scientific publications and submissions to regulatory bodies. A substantial body of literature, accumulating largely in medical journals, expresses concerns as to the integrity of the clinical research enterprise in which we play this central role, due to perceived conflicts of interest of researchers and medical opinion leaders, research programs that commingle science and marketing, and reporting practices that some feel exploit the scientific publication and peer review process for promotional ends. These concerns have led to escalating disclosure requirements in the publication process, including requests for data from biopharmaceutical companies for analytic replication of statistical analyses or for independent reanalysis prior to publication. Such a pre-publication step has since been pro-actively incorporated into some study protocols.

Many biostatisticians are unaware of the specifics of the accumulating critique of clinical research which, if valid, has two distinguishable themes that warrant close attention. One is incomplete reporting of research results, either through failure to publish results of entire studies, or selective omission from publications of patients and/or analyses of relevant endpoints. Critics contend that therapeutic efficacy is thereby exaggerated while safety concerns may be seriously understated. The other is distortion and exploitation of scientific processes and studies for marketing ends through i) programs of intensive production of work designed to mold opinion to favor one or a class of products, ii) studies designed primarily to introduce new products into clinician practices under cover of science (seeding studies), iii) strategic planning and ghost management of research programs by public relations firms, and iv) ghost authorships of research reports and reviews for medical opinion leaders. While their extent is unclear, the existence of these abuses is uncontested.

Statisticians devote considerable efforts to insulate individual studies from threats to internal validity posed by selection and measurement biases, and by confounding. If production and promulgation of these studies, and of other publications that influence their reception, is governed by misattributed or unacknowledged selection mechanisms, then such efforts are at best insufficient. We define bias produced by such mechanisms, in principle, as “promotion bias.” The extent of this bias is unknown.

This paper and accompanying handout constitute an entrée for the biostatistician to the medical literature on claimed practices and instances of publication bias, and responses by the medical profession to this literature. The hope is that more biostatisticians, in all employment venues involved in clinical medical research, will become knowledgeable about and conscious of the issues in this debate on clinical research practices. To the extent that promotion bias exists and is tacitly accepted, the public credibility of Biostatistics as a profession is threatened, and a public stance against the contributing practices seems warranted.