## NAS 2014 on Industry Bias (p. 72):

- "Reviews of human clinical studies have shown that study funding sources and financial ties of investigators are associated with research outcomes that are favorable for the sponsors (Lundh et al. 2012). Favorable research outcomes were defined as increased effect sizes in drug-efficacy studies and decreased effect sizes in studies of drug harm."

- "One study (Krauth et al. 2014) ***has demonstrated funding bias*** in preclinical studies of statins."

NAS 2014 at page 72

- The Krauth et al 2014 study, which looked at animal studies (preclinical) actually found that the ***effect of statins was significantly larger (p value < 0.0001) for studies sponsored by nonindustry sources***.

OPEN ACCESS Freely available online

PLOS | BIOLOGY

# Nonindustry-Sponsored Preclinical Studies on Statins Yield Greater Efficacy Estimates Than Industry-Sponsored Studies: A Meta-Analysis

**David Krauth[1], Andrew Anglemyer[1], Rose Philipps[1], Lisa Bero[1,2]***

**1** Department of Clinical Pharmacy, University of California San Francisco, San Francisco, California, United States of America, **2** Institute for Health Policy Studies, University of California San Francisco, San Francisco, California, United States of America

## Abstract

Industry-sponsored clinical drug studies are associated with publication of outcomes that favor the sponsor, even when controlling for potential bias in the methods used. However, the influence of sponsorship bias has not been examined in preclinical animal studies. We performed a meta-analysis of preclinical statin studies to determine whether industry sponsorship is associated with either increased effect sizes of efficacy outcomes and/or risks of bias in a cohort of published preclinical statin studies. We searched Medline (January 1966–April 2012) and identified 63 studies evaluating the effects of statins on atherosclerosis outcomes in animals. Two coders independently extracted study design criteria aimed at reducing bias, results for all relevant outcomes, sponsorship source, and investigator financial ties. The $I^2$ statistic was used to examine heterogeneity. We calculated the standardized mean difference (SMD) for each outcome and pooled data across studies to estimate the pooled average SMD using random effects models. In *a priori* subgroup analyses, we assessed statin efficacy by outcome measured, sponsorship source, presence or absence of financial conflict information, use of an optimal time window for outcome assessment, accounting for all animals, inclusion criteria, blinding, and randomization. The effect of statins was significantly larger for studies sponsored by nonindustry sources (−1.99; 95% CI −2.68, −1.31) versus studies sponsored by industry (−0.73; 95% CI −1.00, −0.47) ($p$ value$<$0.001). Statin efficacy did not differ by disclosure of financial conflict information, use of an optimal time window for outcome assessment, accounting for all animals, inclusion criteria, blinding, and randomization. Possible reasons for the differences between nonindustry- and industry-sponsored studies, such as selective reporting of outcomes, require further study.

**Citation:** Krauth D, Anglemyer A, Philipps R, Bero L (2014) Nonindustry-Sponsored Preclinical Studies on Statins Yield Greater Efficacy Estimates Than Industry-Sponsored Studies: A Meta-Analysis. PLoS Biol 12(1): e1001770. doi:10.1371/journal.pbio.1001770

**Academic Editor:** Malcolm R. Macleod, University of Edinburgh, United Kingdom

**Received** July 2, 2013; **Accepted** December 9, 2013; **Published** January 21, 2014