

**Scope and Impact of Financial Conflicts of Interest in Biomedical  
Research  
A Systematic Review**

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FROM ABSTRACT

Context

Despite increasing awareness about the potential impact of financial conflicts of interest on biomedical research, no comprehensive synthesis of the body of evidence relating to financial conflicts of interest has been performed.

Objective

To review original, quantitative studies on the extent, impact, and management of financial conflicts of interest in biomedical research.

Data Sources

Studies were identified by searching MEDLINE (January 1980-October 2002), the Web of Science citation database, references of articles, letters, commentaries, editorials, books and by contacting experts.

Study Selection

All English-language studies containing original, quantitative data on financial relationships among industry, scientific investigators, and academic institutions were included. A total of 1,664 citations were screened, 144 potentially eligible full articles were retrieved, and 37 studies met our inclusion criteria.

Data Extraction

The main outcomes were the prevalence of specific types of industry relationships, the relation between industry sponsorship and study outcome or investigator behavior, and the process for disclosure, review, and management of financial conflicts of interest.

Data Synthesis

Approximately one fourth of investigators have industry affiliations, and roughly two thirds of academic institutions hold equity in start-ups that sponsor research performed at the same institutions.

Eight articles, which together evaluated 1,140 original studies, assessed the relation between industry sponsorship and outcome in original research.

Aggregating the results of these articles showed a statistically significant association between [drug] industry sponsorship and pro-industry.

[Drug company sponsored article conclusions favored the drug company 260% more often than conclusions from articles that were not sponsored by drug companies.]

Industry sponsorship was also associated with restrictions on publication and data sharing.

#### Conclusions

Financial relationships among industry, scientific investigators, and academic institutions are widespread.

Conflicts of interest arising from these ties can influence biomedical research in important ways.

#### THESE AUTHORS ALSO NOTE:

Drug industry support of biomedical research in the US increased dramatically in the last 2 decades.

Drug industry's share of total investment in biomedical research grew from 32% in 1980 to 62% in 2000.

From 1980 to 2000 the relationship between academic institutions and the drug industry flourished.

Conflicts of interest are a set of conditions in which a patient's welfare or the validity of research is unduly influenced by financial gain.

Financial conflicts of interests are the most powerful interests faced by investigators and academic institutions.

Financial ties between academic institutions and drug companies "pose a threat to scientific integrity."

In 1999, there was a tragic death of a participant in a drug industry-sponsored clinical trial in which the investigators and the academic institution held significant financial stakes.

A pro-industry conclusion was defined as a study outcome that was favorable to drug industry sponsors.

10 studies reviewed documented the extent of financial relationships among the drug industry, scientific investigators, and academic institutions.

23% to 28% of academic investigators in biomedical research receive research funding from the drug industry.

43% of investigators also receive research-related gifts, including biomaterials and funding.

One third of investigators at academic institutions have personal financial ties with drug industry sponsors.

37% of investigators in the National Academy of Sciences have "dual affiliations" with both universities and drug companies.

An analysis of 789 articles from major medical journals found that 34% were written by lead authors with relevant personal financial interests in drug companies (ie, company patents, equity, advisory board, or director positions).

An analysis of disclosure forms at a single institution found that 7.6% of investigators had personal financial ties with drug company sponsors of their research, including paid speaking engagements (34%), consulting arrangements (33%), positions on advisory boards (32%), or equity (14%).

68% of academic institutions in the United States and Canada have equity in businesses that sponsor research performed at the same institutions.

11 studies concluded that drug industry-sponsored research tends to yield pro-industry conclusions.

Authors who had financial relationships with drug companies were significantly more likely to reach supportive conclusions than authors without such industry affiliations (51% vs. 0%).

"This comprehensive review of the literature confirms that financial relationships among [drug] industry, scientific investigators, and academic institutions are pervasive."

25% of biomedical investigators at academic institutions receive research funding from the drug industry.

The authors of 33% of published articles hold relevant financial interests with the sponsoring drug company.

66% of academic institutions hold equity in 'start-up' businesses that sponsor drug research performed by their faculty.

"Strong and consistent evidence shows that [drug] industry-sponsored research tends to draw pro-industry conclusions."

"Publication bias, or the phenomenon of positive results being published more frequently than negative results, may also play a role in the relation between [drug] industry sponsorship and study outcome."

Drug industry sponsorship may be associated with multiple reporting of studies with positive outcomes, further compounding publication bias and potentially swaying review articles toward more positive results.

Consistent evidence also demonstrated that drug industry ties are associated with both publication delays and data withholding. "Reports suggest that [the drug] industry may alter, obstruct, or even stop publication of negative studies."

**[Very Important]**

"The extensive equity holdings of academic institutions are particularly concerning. Equity ownership has created a new revenue model for academic institutions and has induced a dramatic increase in institutional medical entrepreneurialism, further blurring the lines between academic and commercial values."

The overall compliance of academic institutions and peer-reviewed journals to avoid conflicts of interest with drug companies appears to be poor.

For-profit contract research organizations now consume more than 60% of clinical research funding from the drug industry.

"It is questionable whether institutions that stand to gain substantial benefits from research commercialization can still police themselves."

"This review shows that financial relationships are pervasive and problematic."

"All investigators and sponsors undertaking human participant research should not only fully disclose the nature and extent of their relationships but also make available all research results from completed clinical trials in a comprehensive, publicly accessible registry."

KEY POINTS FROM DAN MURPHY

- 1) Drug company sponsored article conclusions favored the drug company 260% more often than conclusions from articles that were not sponsored by drug companies.
- 2) Financial relationships among industry, scientific investigators, and academic institutions are widespread.
- 3) Drug companies sponsor 62% of biomedical research.
- 4) Financial conflicts of interests are the most powerful interests faced by investigators and academic institutions.

5) Financial ties between academic institutions and drug companies “pose a threat to scientific integrity.”

5A)) Two thirds of academic institutions have equity in drug start-ups that sponsor research performed at the same institutions. This means that if the drug makes money, the academic institution will also profit.

5B)) 68% of academic institutions in the United States and Canada have equity in businesses that sponsor research performed at the same institutions. [Again, this means that if the drug company sponsor of research profits, the academic institution will also profit.]

5C)) 66% of academic institutions hold equity in ‘start-up’ businesses that sponsor drug research performed by their faculty.

5D)) “The extensive equity holdings of academic institutions are particularly concerning. Equity ownership has created a new revenue model for academic institutions and has induced a dramatic increase in institutional medical entrepreneurialism, further blurring the lines between academic and commercial values.”

6) One third of investigators at academic institutions have personal financial ties with drug industry sponsors.

7) 37% of investigators in the National Academy of Sciences have “dual affiliations” with both universities and drug companies.

8) 34% of drug articles are written by lead authors with relevant personal financial interests in drug companies.

9) The authors of 33% of published articles hold relevant financial interests with the sponsoring drug company.

10) Drug industry-sponsored research tends to yield pro-industry conclusions.

11) Strong and consistent evidence shows that drug industry-sponsored research tends to draw pro-industry conclusions.

12) Drug companies that sponsor research may alter, obstruct, or even stop publication of negative studies. **[Very Important]**

13) The overall compliance of academic institutions and peer-reviewed journals to avoid conflicts of interest with drug companies is poor.

14) “This review shows that financial relationships are pervasive and problematic.”