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Commentary

Conflict of interest: a hazard for epidemiology

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Over the last few decades, a noticeable change for the field of epidemiology (and other scientific fields) has been an increasing focus on potential financial conflicts of interest. Policies have been enacted widely that require authors to disclose potential financial conflicts of interest when submitting an article for publication or presenting research at a professional society meeting. In addition, restrictions have been proposed or placed on those with potential financial conflicts. One journal prohibits experts who have relationships with private industry from publishing review articles [1]. Another journal required independent reanalysis for all clinical trials, where the statistical analysis was conducted by researchers employed by private industry [2]. That policy was rescinded after nearly eight years because the independent reanalyses yielded similar results to the original analyses [3]. In 2013, a major clinical oncology society proposed to prohibit submissions to their two journals and their annual meeting from authors employed by or with certain other relationships with private industry [4]. This proposed policy was criticized by other societies (e.g., [5]) and has yet to be implemented. Finally, academic epidemiologists who have consulted or conducted research for private industry tend to be excluded from governmental or nongovernmental panels that are evaluating evidence and advising on public health decisions.

Twenty-five years have passed since Rothman cautioned about the potential harms associated with required financial conflict of interest disclosures and related prohibitions for authorship. In his 1993 commentary—Conflict of Interest: The New McCarthyism in Science [6]—he warned that these practices can distract from scientific evaluation and limit unfairly the purview of experts who otherwise could make contributions to epidemiology and public health. For those with potential financial conflicts of interest, the trend seems to be toward a caste system of lesser professional purview. In this commentary, I address some potential hazards for epidemiology related to current conflict of interest practices and offer some recommendations to partially mitigate these hazards.

Conflict of interest defined

A potential conflict of interest is a nonscientific influence that may affect the probity of a scientist's practice or decision-making. In this case, probity should be interpreted as acting differently than one would have in the counterfactual state, viz. absent the potential conflict of interest. Having a potential conflict of interest indicates the possibility, not the certainty, of affecting a scientist's judgment or actions. Yet, having a potential financial conflict of interest is a basis to engender publication restrictions by certain journals and to exclude capable experts from advisory panels. The strong assumptions inherent in these actions are that these exclusions do not infringe unfairly on the scientific practice of those who have a potential financial conflict, are justified to maintain objectivity or fairness and keep the public's trust, do not suppress important scientific input, and, finally, leave a pool of scientists unaffected by these restrictions who do not have other predominant influences that might affect their actions. If those four assumptions hold, there would be negligible scientific or public health consequences from restrictions based almost exclusively on potential financial conflicts of interest.

Conflicts of interest and objectivity

There is an ample literature regarding the goal of objectivity in science (e.g., [7]). Most would agree that life experiences and worldview are important considerations in the career paths that epidemiologists choose or reject, in the research topics to which they devote their scientific training and expertise, in the affiliations

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and collaborations they develop, and in how they interpret their findings and others' results. Accordingly, it must be infrequent that anyone is objective in the strictest sense of the word: viz., "expressing or dealing with facts or conditions as perceived without distortion by personal feelings, prejudices, or interpretations" [8].

Horton, in an editorial capacity for the journal Lancet, rendered the opinion that the statement "conflicts of interest: none" is an impossibility [9]. He enumerated a number of potential conflicts of interest that fit into the following categories: financial, ideological, personal, and professional. He and others, including those who defend a primary focus on financial conflicts of interest [10], agree that financial and nonfinancial conflicts of interest are equally concerning. Why then is the focus predominantly on financial conflicts? This question has, as yet, received too little consideration. Clearly, the focus on potential financial conflicts does nothing to obviate concern about nonfinancial potential conflicts of interest.

A convenience sample of conflict of interest disclosures

To gain some insight into disclosures being made by authors, in advance of a 2017 lecture on conflict of interest, I reviewed conflict of interest statements associated with commentaries, original articles, and brief reports in the January and June 2016 issues of three leading general epidemiology journals and two epidemiology specialty journals. I also reviewed the journals' disclosure instructions for authors to determine whether financial and nonfinancial potential conflicts of interest are sought for disclosure. The results shed some light on the current guidance from journals and how that guidance is being interpreted by authors (see Table 1).

- Annals of Epidemiology (for which I am an associate editor) instructs all authors to disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential conflicts of interest provided include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. The disclosure form for authorship qualification and conflict of interest disclosures asks the authors to check that they have no affiliation with any organization with a direct or indirect financial interest in the subject matter discussed in the article or to list affiliations that indicate a direct or indirect financial interest. My review of the January and June 2016 issues identified 127 authors for 24 articles. There were two financial disclosures and 125 authors reported no conflicts of interest.
- The American Journal of Epidemiology requires that each author reveal any financial interests or connections, direct or indirect, or other situations that might raise the question of bias in the work reported or the conclusions, implications, or opinions stated—including pertinent commercial or other sources of funding for the individual author(s) or for the associated department(s) or organization(s), personal relationships, or direct academic competition. Furthermore, they ask each author to consider whether there is any arrangement that would embarrass them or any of their coauthors if it were to emerge after publication and it had not been declared. My review included the January 1, 2016, and June 15, 2016, issues. There were 130 authors in 21 articles. Six authors from three articles disclosed a financial conflict of interest, 1 author disclosed being on an advisory board for an environmental solidarity nongovernmental organization. One author's financial conflict was noted to be after the completion of analyses for the article. The remaining 123 authors reported no conflicts of interest.
- The journal Epidemiology instructs authors to state all possible conflicts of interest including financial, consultant, institutional, and other relationships that might lead to bias or a conflict of interest. If there is no conflict of interest, authors are to state this explicitly as "none declared." Authors are also instructed to consult the recommendations on potential conflicts of interest from the International Committee of Medical Journal Editors (www.icmje.org/update.html). My review included the January and May 2016 issues (there being no June 2016 issue). In 42 articles, there were 216 authors. Six authors from two articles reported a potential financial conflict of interest. The remaining 210 authors reported no conflicts of interest.
- Pharmacoepidemiology and Drug Safety instructs authors that they are responsible for disclosing all financial and personal relationships between themselves and others that might appear to bias their work. To prevent ambiguity, authors must state explicitly on the conflict of interest form whether potential conflicts do or do not exist. Authors should describe the role of the study sponsor(s), if any, in study design, in the collection, analysis and interpretation of data, in the writing of the report, and in the decision to submit the report for publication. If the supporting source(s) had no such involvement, the authors should so state. My review included the January and June 2016 issues. There were 147 declared authors in 29 articles. One article was a committee report with 38 contributors, but no declared authors and no conflict of interest declaration. Focusing on the remaining 28 articles, 22 articles including 119 authors had no declared conflicts of interest. In six articles that had at least 1 author with a declared potential conflict of interest, 15 authors declared a potential financial conflict of interest, 1 author declared what I interpreted as a nonfinancial conflict of interest (viz. being a consultant to a nurses' specialty society on postpartum quality care), and 12 authors reported no conflicts of interest.
- Cancer Epidemiology Biomarkers and Prevention's policy requires that authors and reviewers reveal any relationships that they believe could be construed as resulting in an actual,

Table 1
Conflict of interest disclosures in selected epidemiology journals

	# Articles	# Authors	# Articles reported financial COI (%)	# Authors reported financial COI (%)	# Authors, nonfinancial COI (%)	# Authors reporting no COI (%)
American Journal of Epidemiology	21	130	4 (19%)	7 (5%)	1* (1%)	123 (95%)
Annals of Epidemiology	24	127	2 (8%)	2 (2%)	0 (0%)	125 (98%)
Epidemiology	42	216	2 (5%)	6 (3%)	0 (0%)	210 (97%)
Cancer Epidemiology Biomarkers and Prevention	43	427	15 (35%)	27 (6%)	1* (0%)	400 (94%)
Pharmacoepidemiology and Drug Safety	29	147	6 (21%)	15 (10%)	1 (1%)	131 (89%)
total	159	1047	29	57	3	989

COI, conflicts of interest.
* Author reported both a financial and nonfinancial potential conflict of interest.

potential, or perceived conflict of interest with regard to the manuscript submitted for review. The authors are responsible for providing a detailed conflict of interest statement on the title page of their submission, even if there are no conflicts to disclose. If the manuscript moves to the revision stage, each of the authors will be contacted and asked to complete an individual, electronic conflict of interest form. According to the journal, the existence of financial interests or other relationships of a commercial nature is not necessarily regarded as creating a conflict of interest. Rather, the journal states that its policy represents a recognition of the many factors that can influence judgments about research data and a desire to make as much information as possible available to those reviewing the data. If a potential conflict of interest is disclosed, notification concerning the relationship will be published along with the article. My review included the January and June 2016 issues with 43 articles and a total of 427 declared authors. For 28 articles involving 277 authors, no author declared a conflict of interest. For 15 articles, at least 1 author declared a potential conflict of interest and the total number of authors declaring a potential conflict of interest was 27. The remaining 123 authors on these 15 articles declared no conflict of interest. One author who declared a financial conflict of interest, also declared a nonfinancial conflict of interest (being a member of a scientific advisory board for a professional society that might have an interest in the subject matter of the article).

The data from this review are summarized in Table 1. A few themes emerged. Approximately, 5% of authors reported potential financial conflicts of interest. Second, it is exceedingly rare (0.3% of authors) for nonfinancial conflicts of interest to be reported. Finally, there appears to be a higher proportion of authors reporting potential financial conflicts of interest in specialty journals versus general epidemiology journals.

The focus on financial conflicts partially explained

It is clear from even this cursory review that conflict of interest disclosures other than “none” are infrequent in journal articles and largely restricted to potential financial conflicts of interest. Indeed, the guidance to authors from the three general and two specialty epidemiology journals noted previously is most explicit for potential financial conflicts of interest. Thompson [10] has justified this focus based on the straightforwardness of identifying financial conflicts:

> “Conflict-of-interest rules usually focus on financial gain, not because it is more pernicious than other secondary interests, but because it is more objective and more fungible. … Just because we cannot do much about other secondary interests, it does not follow that we should do little about financial gain”

Is it true that we cannot identify nonfinancial interests? If so, the status quo seems an unsatisfactory state leaving potentially important interests undisclosed. Surely, some important nonfinancial interests can be identified. Consider the legal process known as *voir dire*: the questioning of prospective jurors to assess whether they can consider the matter at hand fairly. Prospective jurors are frequently asked about membership or contributions to organizations that might have an interest in the outcome of the trial. Clearly, epidemiologists could be requested to disclose membership or contributions to advocacy or other organizations that have an interest in the outcome of their research. Prospective jurors are also asked about whether they have personal beliefs that might influence their decisions. Again, this seems straightforward and applicable to disclosure of interests in epidemiology. Finally, epidemiology is a profession that often involves extensive efforts to measure difficult concepts (e.g., suicidal ideation, pain, nutritional intake). Eliciting information about authors’ nonfinancial interests is unlikely to be beyond our profession, given the same focus accorded to financial interests. It simply has not been a priority.

The lack of priority about nonfinancial interests helps get to the root of why potential financial conflicts of interest are prioritized. It does not seem to be rooted in the inherent risk of biased evaluation by epidemiologists with financial versus other conflicts of interest. Instead, the relative lack of concern about nonfinancial interests likely reflects an endorsement of certain career paths over others by most epidemiologists or a blind spot or sympathy for certain nonfinancial interests. Historically, private industry has been on the wrong side of many public health issues and these instances are object lessons during training in epidemiology. Nonetheless, if the intent of conflict of interest disclosures is to provide information that readers should know to help judge the possibility of bias on the part of epidemiologists, we are likely missing many important nonfinancial disclosures. That should be concerning to all who believe in full disclosure of potential conflicts of interest per se.

Increasing transparency regarding conflicts of interest

Horton considers it a fallacy that disclosure heals the “wound” inflicted by conflicts [9]. In addition, he argues, as Rothman did [6], that disclosure may influence reviewers and hinder fair evaluation of an article or a scientist's opinion. Is this just a theoretical concern? Kesselheim et al. [11] investigated whether funding source affected clinicians' evaluations of clinical trial data. Clinicians, unbeknownst to them, were randomly assigned to evaluate abstracts that described fake clinical trials methods and results. The abstracts were identical other than the attributed funding source (industry, NIH, and none). Industry sponsorship appreciably and negatively influenced the perception of the quality of the work and the willingness of clinicians to believe and act on the trial findings. It is impossible to judge the implications of these findings for disclosures more generally, but these findings certainly lend credence to concerns that have been expressed by Rothman [6], Horton [8], and others.

Nonetheless, there is value in disclosing potential financial and other conflicts of interest. The value is as much for study teams as for readers and consumers of research. It would benefit any study team to share a disclosure of interests for all collaborators at the initiation of research projects so as to keep in mind factors that might influence their study conduct or interpretation. Perhaps this disclosure of interests should be a standard part of study protocols. This would apply equally to those with financial and nonfinancial potential conflicts of interest. Subsequent disclosure at publication of the interests weighed by the study team during study design and conduct would provide an enhanced level of transparency to consumers of epidemiologic research.

Broadening participation on governmental and nongovernmental advisory panels

Having observed and testified before many advisory panels over my 40 years in the field, it is unquestionable that capable scientists with a current or even an historical relationship with private industry tend to be excluded from eligibility for advisory panels, even when the relationship with industry is not related to the scientific matter under consideration. It seems worth considering whether these exclusions serve the interest of public health. The pool of excluded scientists often includes many experts with relevant experience who would presumably broaden the advisory input for

any public health decision. As Rosenbaum noted, the general ban on industry ties during regulatory reviews introduces its own bias [12] and can allow true experts to be replaced by others who have less expertise but are free of financial conflicts [13].

The perception that a governmental or regulatory panel was populated mostly with scientists of a particular viewpoint can lead to controversy [14, 15]. It is perhaps ironic that exclusions meant to maintain the public trust can have the effect of raising controversy that can erode public trust. Rosenbaum opined [13] that the focus on (financial) conflict of interest has resulted in an erosion of public trust, which presumably it was meant to avert. Broadening eligibility for government panels to all who have acknowledged expertise would likely increase the breadth of scientific evaluation, rather than possibly limiting the range of scientific debate through selective exclusions. The public and the epidemiologic community could therefore be assured that selection bias did not contribute to a particular (perhaps controversial) outcome and that the decision was based on scientific debate that considered a wide spectrum of views.

Final thoughts and recommendations

The purpose of this commentary is not to advocate for change to the status quo regarding disclosure of potential financial conflicts of interest. That train has left the station. Rather, the purpose is to point out that the predominant focus on financial interests does not obviate concern about other types of interests and that conflict of interest disclosures and restrictions can hinder scientific evaluation. We know relatively little about the impact of the changes caused by conflict of interest requirements on the profession of epidemiology. A more extensive evaluation of disclosures in journals would be informative as would more study of the potential impacts of disclosures and restrictions on the evaluation of scientific issues. Updating instructions to authors by journals to flesh out important nonfinancial interests would be a step toward uniformity in identifying important conflicts of interest per se.

Conflict of interest is a hazard for epidemiology to the extent that it limits the purview of scientists whose practice is not affected by their potential conflict and limits fair consideration of a scientist's work. There are actions that epidemiologists can take to partially mitigate these hazards. Epidemiologists should avoid and discourage criticism by others based on an author's affiliation or funding source to keep the focus on scientific matters. Journals could conduct blind peer review so that conflict of interest disclosures do not influence peer reviewers' assessments and recommendations and result in publication bias. More diverse membership on advisory committees seems desirable from a scientific standpoint and likely would be more informative for the sponsoring entities. Selective exclusions on scientific panels based on one type of interest pave the way for unwanted influences by other interests and can have a negative effect on the collective expertise of a scientific panel. It seems unlikely that the perspective and depth of understanding of those with potential financial conflicts of interest are totally replaceable.

Finally, the polarizing nature of the conflict of interest status quo has the potential to color as adversarial valid criticisms from peers with perceived competing conflicts of interest. The impacts can be to detract from appropriate consideration of valid criticisms and to preclude cooperation to resolve conflicting scientific viewpoints. More cooperation to resolve differing viewpoints among those with competing conflicts of interest would likely expedite progress in epidemiology.

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