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REVIEW



Academic conflict of interest

Djillali Annane^{1*}, Nicolas Lerolle^{2,3}, Sylvain Meuris⁴, Jean Sibilla⁵ and Keith M. Olsen⁶

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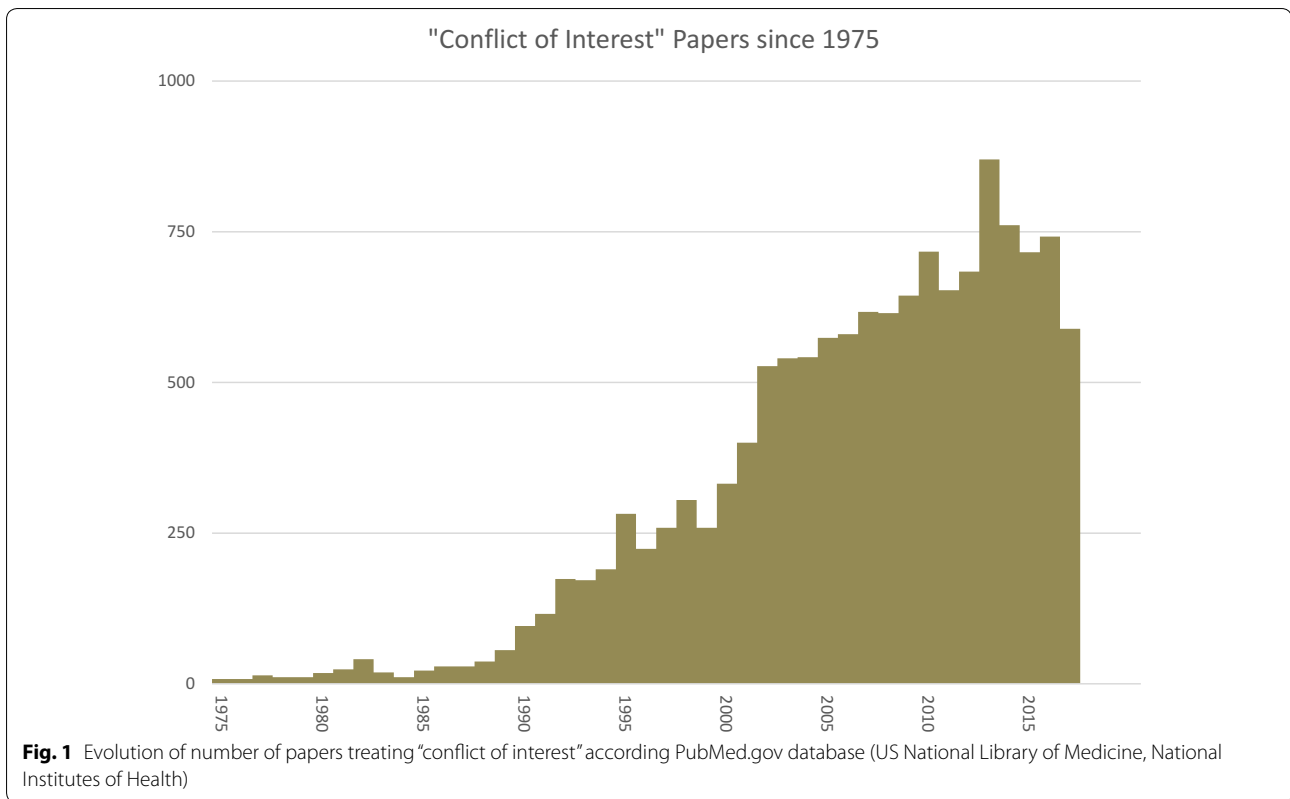
Abstract**Purpose:** We set out to summarize the current challenges in academic conflict of interest.**Methods:** This is a narrative review by a multidisciplinary, multinational panel of academic officers including deans of medical/pharmacy schools.**Results and conclusions:** Disclosing conflict of interest has become the appropriate professional behavior since the 1990s in response to the necessity to fix moral and financial fences around medical activities. The nature of the conflict of interest is academic when either the conflict relates to academic duties and/or the nature of the interest is academic. People usually distinguish between real conflict of interest, when private interest overtly influences one's professional obligations; potential conflict of interest, when there is no obvious direct link between a person interests and current duties without ruling out that expected changes in duties cause a situation of conflict; and apparent conflict of interest, when the risk does not really exist, but serious doubts remain. Areas at risk of academic conflict of interest include peer review process for grant evaluation or journals, scientific communications such as elaborating and disseminating clinical guidelines, lecturing at meeting, advising decision-makers, teaching activities, and mentoring. The management of academic conflict of interest should consider actions in four domains, i.e., education, prevention, measures for enforcement and solving, and communication. Academic conflicts of interest are as frequent as financial conflicts but more difficult to identify and assess, and much less addressed in the literature. Generating more evidence from high-quality research is mandated to improve the management of academic and more generally non-financial conflicts of interest.**Keywords:** Medical education, Mentoring, Peer review, Health policy**Introduction**

Conflict of interest (COI) has been part of daily life in any group of people since the beginning of humanity. Humans expect legitimately some benefits from any of their acts with or without taking into consideration the potential impacts on others. Therefore, civilizations have adopted rules to minimize detrimental consequences from COI. In the health sector, most countries and numerous national and international institutions have seriously addressed the issue of financial COI whether

or not it is related to the pharmaceutical industry [1]. Therefore, disclosing COI has become the normal rule and the correct behavior since the 1990s in response to the necessity to fix moral and financial fences around medical activities. This reflection is now integrated into our operating system and represents an important part of health professionals' social responsibility, whether working in hospitals, universities, or public or private institutions. The nature of a COI is often non-financial, e.g., political, religious, social, or academic. Despite the substantial and rapid increase in the estimated number of papers about COI published since 1975 (Fig. 1), the issue of non-financial COI has been much less addressed. The current article provides the readers with definition, identification of areas at risk, and proposals for prevention and management of academic conflict of interest.

*Correspondence: djillali.annane@aphp.fr¹ Simone Veil Health Science Center, University Versailles SQY, University Paris Saclay, Raymond Poincaré Hospital (APHP), 104 boulevard Raymond Poincaré, 92380 Garches, France

Full author information is available at the end of the article



Definition of academic conflict of interest

The haze surrounding the concept of conflict of interest makes it imprecise and difficult to define, in particular for academic COI. According to *Webster's New World College Dictionary*, “conflict” arise from classical Latin *conflictus*, past participle of *confligere* which means “to strike together” [2]. Literally, it means that someone’s interests are negatively impacted by disagreement or opposition, as of ideas or interests, between at least two groups or individuals [3]. “Interest”, issuing from classical Latin *inter* and *esse*, meaning “to be between”, can be defined as the amount of money paid for the use of someone else’s money or more commonly as the right or claim someone has over something [4]. In the case of academic COI, the interests at stake can take many forms such as scientific reputation, political advantages in an academic institution, professional promotion, and leadership position. Obviously, these “interests” often yield indirect financial benefits. Academic COI is not limited to COI of an academic person. The nature of the COI is academic when either the conflict relates to academic duties and/or the nature of the interest is academic, including intellectual bias. Faculty in biomedical centers are at the interface of education, research and clinical care, and the public [5]. Thus, they are exposed to the risk of a contradiction between their academic missions and

their private interests with subsequent impact on their academic duties [6]. Practically, conflict of interest can be real, potential, or apparent (Table 1) [6]. A real academic COI arises for example when academic people may take advantage from governmental appointment to get public grants for their own laboratory [7]. It is important to distinguish legal and ethical aspects of academic COI. According to Dickens and Cook, COI arises when those who owe conscientious duties to others appear to have personal interests tempting them to subordinate those duties to their self-interest [8]. Then, they may violate binding legal duties such as fiduciary duties [8].

Areas at risk of academic conflict of interest

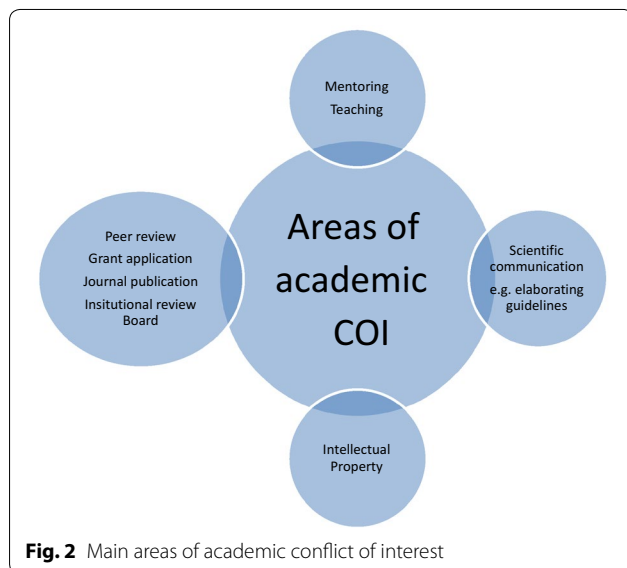
Conflict of interest affects every aspect of medicine, including clinical care, teaching, research, organizational decision-making, and procurements and purchases. Situations at risk of academic COI include the peer review process, scientific communications, elaboration of guidelines, academic promotion, teaching activities, and curricula (Fig. 2).

Scientific and scholarly activities

Scientific and scholarly activities are often key determinants for decision-making on public policy. They need to be accurate, reliable, and trustworthy. Academic COI

Table 1 Definitions of academic conflict of interest

	Definition	Examples
Real conflict of interest	Overt and direct private benefits from one's professional duties	An editor of a scientific journal that takes care of the editorial process for a paper submitted by his/her institution
Potential conflict of interest	No obvious private advantages from actual professional duties but expected changes in duties may likely cause COI	A woman is a faculty member of the school of medicine. Her husband is a candidate to be recruited for a faculty position at the same school of medicine (no obvious COI) for the near future and she will likely become the new dean in charge of recruitment (change in academic duties that create a COI)
Apparent conflict of interest	There is no real interest but doubts remain	A scientist well recognized for his/her academic work on drug X for sepsis is part of the panel elaborating guidelines of how to treat sepsis
Conflict of commitment	Having substantial outside activities with subsequent interferences on duties relative to the primary employer	A full-time academic researcher takes the position of editor in chief of a scientific journal resulting in slowing down his/her research program



may involve collegial governance and activities such as teacher's recruitment, re-employment or promotion, and curricula. Institutions often consider that there is a risk of academic COI when their personnel have outside activities, such as membership of another entity whether academic or not, or conducting research, educational courses, or expertise for a third party. Such outside academic activities may raise legal concerns, e.g., when they are conducted with the institution's resources, facilities, or personnel, or when confidential information are disclosed to third party.

Academic conflict of interest and peer review process

Scientists are by nature motivated by figuring out the reality about life and do not care much about being paid less than others with similar level of qualification [9].

In keeping, a large survey of doctoral students showed that more than half of them wished to embrace an academic career [10]. Nevertheless, the guarantee of scientific integrity in academic competition remains a major challenge.

Academic grant evaluation

Allocation of research resources is a crucial issue for international organizations, at country level, and for universities, as it will seriously orientate the direction of the scientific knowledge. In the 1950s, the peer review process was established as the gold standard for evaluation of grant applications [11]. Later, allocation of research resources was recognized as an area at high risk of academic COI. Indeed, the competition for research funding is more and more intense with subsequent biased grant evaluations [12]. There is growing evidence of major limitations in the peer review process for the allocation of resources [13–15]. A survey of the peer reviewer panel for the French Ministry of Clinical Health Research Program (Programme Hospitalier de Recherche Clinique) pointed out that academic rather than financial COI was challenging [16]. In this survey, the panel was more concerned by between-specialty conflicts than by rivalry, cronyism, or geographic conflicts. Of note, they could not demonstrate the existence of such academic COI during the evaluation of grant applications, highlighting the lack of an objective identification test, and felt it was unavoidable [15]. A recent analysis of factors influencing the ratings of research grant applications in Canada evidenced major impact of academic COI on allocation of resources, with peer reviewers favoring applications from their own institution or from other members of the same panel [14]. A survey of international public and private organizations funding biomedical research found that willingness to support external fairness in cases was

the main motivation for only about half of reviewers [17]. Because the peer review process fails in discriminating between projects of roughly similar good quality [12, 13], ratings of applications tend to be driven by academic COI.

Peer review of scientific papers

Publication of the results from scientific research is a sine qua non condition for the advancement of knowledge and the improvement of health care. Therefore, it is thought that peer review is crucial to filter good from bad science [18]. However, the number of scientific publications has become a key factor for academic promotion, favoring quantitative rather than qualitative scientific production, particularly among young scientists [1]. Therefore, academic pressure to publish is surely a cause of scientific fraud and of academic COI. Interestingly, peer reviewers suggested by authors are more likely than those chosen by editors to recommend acceptance of a paper, and authors that requested excluding some reviewers are more likely to get their paper published [19]. In a recent analysis of outcomes of papers that were rejected by three major medical journals, roughly 80% were eventually published in another journal, including journals of higher impact factor [20]. The three “focal” journals rejected the 14 most cited articles. These findings highlight the complexity of the peer review process for scientific journals, including a likely contribution of academic COI in some decisions to reject.

Institutional review board assessment of research projects

Review of research projects by an institutional review board (IRB) is also a source of intellectual, religious, or political COI. No matter who is sponsoring the research, the task of IRB members is by nature an academic duty. A survey of IRBs at 100 US academic institutions conducted in 2005 showed a high prevalence of members with COI but only half of them being declared [21]. Of note, a decade later, there was no evidence of improved behavior [22].

Academic conflict of interest and scientific communications

Disseminating the results of science is of paramount importance for advancing the quality of care and for the awareness of health consumers. The main tools for such dissemination include elaborating guidelines, conferences at scientific meetings, social networks, and interviews with lay media. The promotion of scientific findings is unavoidably exposed to intellectual COI, as illustrated by biased reports from systematic reviews toward the inclination of leading authors of trials when they also lead the systematic review [23]. However, intellectual

COIs are much less frequently disclosed than financial COI by authors of systematic reviews [24]. Elaboration of clinical practice guidelines requires careful attention to COI to prevent serious flaws. As an example, the highest French administrative court (Conseil d'Etat) requested in 2011 the immediate withdrawal of guidelines on diabetes and on dementia elaborated by the French National Health Authority (Haute Autorité de Santé) owing to undisclosed serious COI for panel members [25]. Unfortunately, there is substantial evidence for under-reporting of COI and poor compliance to standards for management of COI in guideline panels [26–28]. Intellectual COI can also influence health authorities or policy-makers. For example, recently the European Medicine Agency (EMA) recommendation to withdraw from the European market starches as fluid replacement therapy was refuted by the European Commission, partly as the EMA decision was contrary to the unanimous recommendation by its own ad hoc expert committee to keep these drugs on the European market with measures to reinforce practitioners' compliance to current restrictions [29]. The members of the EMA ad hoc committee were selected as they were free of financial COIs according to EMA policy. Did they have academic interest in opposing the withdrawal of starches from the market? There is no evidence that one or more of the experts got academic promotion from their participation in this committee. None of the members had on going academic-driven “starches” trials (according to the main trials registries) that could have been prematurely stopped in case of withdrawal of starches from the market. Finally, it is hard to evaluate any positive benefits in terms of academic reputation.

Medical students/trainees and mentoring

Academic institutions, in particular medical schools and academic hospitals, have a critical role as first exposure to COI during the curriculum may shape the behavior of future practitioners [30]. Situations exposing trainees to COI include mainly gifts with or without educational values (e.g., books), meals in or outside the campus, free drug samples, industry-sponsored educational events (with or without participation of faculty staff), interviews with pharmaceutical/device sales representatives (referred to as detailing), and industry-sponsored fellowship [31]. Of note, medical students, albeit recognizing the biases of industry-sponsored education, claimed interaction with industry as a necessary part of their education. Most of them agreed that gifts from industry may bias drug prescriptions, contrasting with only 2.4% admitting such a risk for themselves [32], in keeping with social science knowledge that bias is recognizable, but only in others [33]. Moreover, the perception that gifts, even small, do not impact one's behavior is not supported

by evidence from social science research demonstrating that an individual's judgments are always subjected to unconscious and unintentional self-serving bias [33].

Medical students are influenced by clinical exposure to a role model in the medical school, highlighting the key mission of faculty members in preventing trainees' exposure to COI [34]. Interestingly, junior faculty often identified mentor's intellectual COI as a barrier for formal or informal mentoring [35]. Among these academic COI, the most cited include conflict between the mentoring and supervisory roles of the mentor, confidentiality breaches, mentor bias, lack of "active listening", and role confusion [36].

Intellectual property

Intellectual property is an original result of someone's work whether material or not. The World Intellectual Property Organization (WIPO), a self-funded agency of the United Nations, has 191 member states. WIPO aims at developing and maintaining a balanced international intellectual property system. Most countries have developed national legislation to protect individual intellectual property. Most public and private organizations have implemented internal guidelines and developed COI clauses for their employees. Over time, transfer of knowledge, industrial valorization, and commercialization have become strategic missions of academic institutions including academic hospitals. Any outside activity whether scholarly or research by an organization's employee is therefore a potential source of academic conflict of interest.

Management of conflict of interest

Benjamin Franklin, an American statesman, entrepreneur, and part-time scientist created the axiom that "an ounce of prevention is worth a pound of cure". Although the quote was referring to fire safety, it is as true today when applied to health care and even more so to conflict of interest as it was when Franklin made the quote. Many parties including professional organizations, government entities, and consumer groups have called for increased transparency of COI declarations, policies, and procedures when it comes to health care, organizational decision-making, education, and research integrity. However, this is much more complicated than it sounds when applied to academic COI, and the first steps of any organization must center around the identification of who, where, and what COI potentially exists and then how to track and discipline it if necessary. The pillars for management of academic COI are basically the same as for financial COI and include mainly education, prevention, evaluating, solving, enforcing, and communicating (Fig. 3) [1].

Education

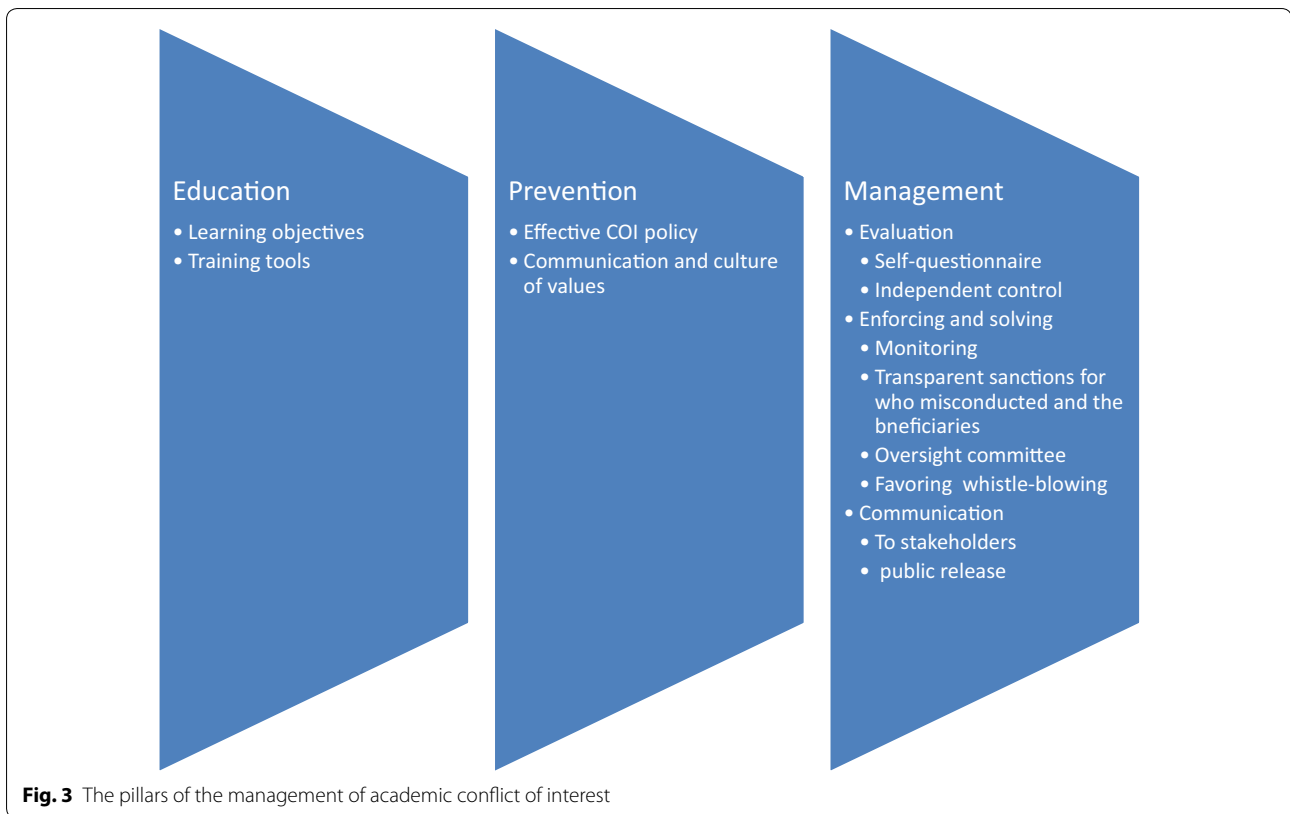
Medical school teaching programs, trainee programs, and continuous medical education programs have to include dedicated courses for not only increasing awareness but also developing specific competencies about COI whether financial or non-financial. Medical schools should define clear learning objectives, training tools such as cases studies, MOOC or simulation-based training, and self-tests [6]. These training courses aim at developing practical skills to know how to recognize and manage COI. Being trained to prevent and manage academic COI should apply at all levels in academic institutions, from students to deans. It also should be a requirement before taking any academic duties, including mentoring, editorial activities, peer review [37], contributing to IRB activities, clinical practice guidelines elaboration, educational activities for scientific societies, and advising decision-makers in academic institutions or public health authorities. Academic institutions such as medical schools should also provide training courses for community groups as a way to reinforce public trust [6].

Prevention

The recommendations for prevention of COI now commonly found in academic organizations include disclosure policies and definitions with specific examples of what a COI means to both the individual and the organization.

Effective conflict of interest policy

Many countries have enacted national law to manage financial COI [1]. Medical schools have issued strict policies to avoid exposing students and trainees to COI [38, 39] with subsequent major improvement in their management of COI [40]. Several US medical schools have set up the Commission on Interactions with Industry, with the Education Review Board (ERB) overseeing industry support of educational activities on the basis of a "multi-funder" rule [41]. The World Association of Medical Editors (WAME) recommended elements of COI policies and encouraged editors of medical journals to have their own standards [42]. The key elements are (1) having a clear and transparent definition of COI, (2) description of types of COI, (3) clear statement of what needs to be declared and how, and (4) transparency on how the journal will handle COI. Analysis of COI policy of 399 high-impact medical journals found that financial, non-financial, and editors' COI disclosures were required in 89.7%, 70.2%, and 38.8% of journals [43]. These findings suggest that intellectual COIs, albeit less than financial COIs, are addressed by journals. Nevertheless, non-financial COI policy varies across journals, from requirement to encouragement



owing to the complex nature of private interests [44]. By contrast, editor's COI continues to be neglected by the majority of biomedical journals, making unfair differences between editors and authors. Organizations that participate in clinical guideline development should adopt strict policies on private interests, beyond financial COIs. In practice, a study of policies of COI in guideline development from 29 organizations in 19 countries determined that 7/19 (37%) applicable organizations did not clearly report disclosures prior to guideline panel membership [45]. Likewise, formal policy about non-financial COI is often lacking in the process of public grant evaluation [16]. Academic COI disclosure should not be construed as individuals considered experts and/or who have published extensively in a therapeutic area not being allowed to participate, but rather clear defined criteria should determine who and who cannot participate [46].

We firmly recommend that non-financial COI policies be adopted by any professional organizations or entity performing academic duties and they may use OECD tools to this aim [6].

Communication and culture of values

Entities engaged with academic duties should communicate and make sure their policy on COI and sanctions

relative to misconduct are understood, should promote individual responsibility, commitment to academic integrity, professionalism, and accountability, should develop the culture to disclose and discuss COI matters, and should anticipate and actively communicate about areas at risk of academic COI [1, 6]. Fundamental to prevention of serious COI or its consequences starts with a culture of expectations, integrated into core values. It is difficult for employees to take COI serious if they perceive those at the highest level of the organizations not following the policies that they set forth.

Management

Evaluating

Academic COIs have to be declared before engaging in academic duties and revisited on a regularly basis and at any time duties or personal interests may have changed. Individual COI declaration is largely based on a voluntary release of information to the organization. Self-regulation alone may not adequately protect the individual or the institution [47]. Organizations need to develop their own questionnaire to disclose non-financial COI which should cover areas at risk in relation to the expected academic duties [6]. In contrast to financial COI disclosures that can be controlled in many countries via law-mandated open access databases, controlling the accuracy of

private interests may be unworkable [44]. Thus, all disclosures should be reviewed not only by the immediate supervisor but also by a dedicated COI oversight committee of unbiased, informed people that are void of COI.

Enforcing and solving

Organizations need to set up transparent procedures for demonstrating a breach in the academic duties in relation to private interests, and a set of proportional consequences. Those individuals who fail to comply with the COI policy should be barred from all related academic duties as a disciplinary sanction. In addition, any related decision should be retroactively cancelled; and depending on the seriousness of the consequences of the misconduct, the beneficiaries may be excluded from future processes [6].

A COI oversight committee should monitor the compliance with COI policy and may be involved to resolve issues when a complaint has been received regarding an individual, department, division, or the organization itself. The committee must also be empowered to discipline the employee. Organizations should have processes that allow or encourage whistle-blowers to raise concerns regarding an individual or the organization in a confidential and non-punitive manner [6]. Employees that express concerns about a COI should be allowed to do so in good faith without the fear of discipline or dismissal. Every individual has the obligation to report matters to superiors and in a confidential manner to the COI committee to ensure that an identified COI issue is addressed appropriately.

Communicating

Organization involved with academic duties should make public their COI policy to reinforce stakeholder trust. They also should actively communicate internally about any update of the institution's COI policy, training courses, and procedures for prevention and management of COI. All COI disclosures related to academic activities should be registered at best in an open access database. Non-compliance to COI should be communicated to all stakeholders concerned with academic duties and whenever resulting in serious breach they likely need to be publicly released to prevent others being subjected to repercussions from the responsible individuals.

Conclusion

Academic COIs, often referred to as private interests, although as frequent as financial COIs, have been much less addressed. Although not consensual, COIs are of academic nature when either the duties or the interests are academic and not directly financial. Organizations involved with academic activities should make sure

their COI policy sufficiently covers the issue of intellectual COI. They need to implement educational activities, preventive measures, and measures of independent evaluation of COI, of enforcement, and communication. Improvement in the prevention and management of academic COI requires that more evidence be generated from high-quality research.

Author details

¹ Simone Veil Health Science Center, University Versailles SQY, University Paris Saclay, Raymond Poincaré Hospital (APHP), 104 boulevard Raymond Poincaré, 92380 Garches, France. ² Faculty for Health Sciences, Angers University, Angers, France. ³ Angers University Hospital, Angers, France. ⁴ School of Medicine, Université Libre de Bruxelles, Brussels, Belgium. ⁵ School of Medicine, University of Strasbourg, Strasbourg, France. ⁶ UAMS College of Pharmacy, University of Arkansas for Medical Sciences, 4301 W. Markham St., Little Rock, AR 72205, USA.

Compliance with ethical standards

Conflicts of interest

None of the authors have financial disclosure directly or indirectly relative to this article. DA was involved in the process for the decision of whether or not to withdraw starch solutions from the European market. He was a member of the European Medicines Agency ad hoc expert committee that recommended against the withdrawal of these products from the market. DA was the primary investigator of CRYSTAL, a publicly funded international open-label trial of crystalloids versus colloids in critically ill with severe acute hypovolemia (JAMA 2013). This trial was the only large trial reporting benefit from colloids in terms of 90-day mortality. DA was also the senior author of a network meta-analysis about fluid resuscitation in sepsis that concluded that balanced crystalloids and albumin may reduce mortality compared with any other fluid (Annals Internal Medicine 2014).

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References

- Annane D, Charpentier B (2018) Do I have a conflict of interest? Yes. *Intensive Care Med*. <https://doi.org/10.1007/s00134-018-5285-7>
- Webster's New World College Dictionary. <http://websters.yourdictionary.com/conflict>. Accessed 24 Oct 2018
- <https://en.wiktionary.org/wiki/conflict>. Accessed 24 Oct 2018
- <https://en.wikipedia.org/wiki/Interest>. Accessed 24 Oct 2018
- Stead WW (2017) The complex and multifaceted aspects of conflicts of interest. *JAMA* 317(17):1765–1767
- Organisation for Economic Co-operation and Development (2003) Managing conflict of interest in the public service: OECD guidelines and overview. OECD, Paris
- Wolfe D (1962) Conflict of interest. *Science* 138(3543):865
- Dickens BM, Cook RJ (2006) Conflict of interest: legal and ethical aspects. *Int J Gynaecol Obstet* 92:192
- <https://www.thisismoney.co.uk/money/article-2269520/Best-paid-jobs-2012-Official-figures-national-average-UK-salaries-400-occupations.html> Accessed 5 October 2018
- Lee A, Dennis C, Campbell P (2007) Graduate survey: a love–hurt relationship. *Nature* 550:549–552
- Jefferson T, Godlee F (2003) *Peer review in health science*, 2nd edn. Wiley, London, p 392
- Chubin DE, Hackett EJ (1990) *Peerless science: peer review and US science policy*. SUNY series in science, technology, and society. The New York University Press, New York

13. Graves N, Barnett AG, Clarke P (2011) Funding grant proposals for scientific research: retrospective analysis of scores by members of grant review panel. *BMJ* 343:d4797
14. Pier EL, Brauer M, Filut A et al (2018) Low agreement among reviewers evaluating the same NIH grant applications. *PNAS* 115(12):2952–2957
15. Tamblyn R, Girard N, Qian CJ, Hanley J (2018) Assessment of potential bias in research grant peer review in Canada. *CMAJ* 190(16):E489–E499
16. Abdoul H, Perrey C, Tubach F, Amiel P, Durand-Zaleski I, Alberti C (2012) Non-financial conflicts of interest in academic grant evaluation: a qualitative study of multiple stakeholders in France. *PLoS One* 7(4):e35247
17. Schroter S, Groves T, Højgaard L (2010) Surveys of current status in bio-medical science grant review: funding organisations' and grant reviewers' perspectives. *BMC Med* 8:62. <https://doi.org/10.1186/1741-7015-8-62>
18. Kassirer JP, Campion EW (1994) Peer review. Crude and understudied, but indispensable. *JAMA* 272(2):96–97
19. Grimm D (2005) Suggesting or excluding reviewers can help get your paper published. *Science* 309:1974
20. Siler Kyle, Lee Kirby, Bero Lisa (2015) Measuring the effectiveness of peer review. *PNAS* 112(2):360–365
21. Campbell EG, Weissman JS, Vogeli C, Clarridge BR, Abraham M, Marder JE, Koski G (2006) Financial relationships between institutional review board members and industry. *N Engl J Med* 355(22):2321–2329
22. Campbell EG, Vogeli C, Rao SR, Abraham M, Pierson R, Applebaum S (2015) Industry relationships among academic institutional review board members: changes from 2005 through 2014. *JAMA Intern Med* 175(9):1500–1506
23. Glaser BE, Bero LA (2005) Attitudes of academic and clinical researchers toward financial ties in research: a systematic review. *Sci Eng Ethics* 11:553–573
24. Hakoum MB, Anouti S, Al-Gibbawi M et al (2016) Reporting of financial and non-financial conflicts of interest by authors of systematic reviews: a methodological survey. *BMJ Open* 6(8):e011997
25. Lenzer J (2011) French guidelines are withdrawn after court finds potential bias among authors. *BMJ* 342:d4007
26. Bindslev JB, Schroll J, Gøtzsche PC, Lundh A (2013) Underreporting of conflicts of interest in clinical practice guidelines: cross sectional study. *BMC Med Ethics* 14:19
27. Knai C, Brusamento S, Legido-Quigley H et al (2012) Systematic review of the methodological quality of clinical guideline development for the management of chronic disease in Europe. *Health Policy* 107(2–3):157–167
28. Norris SL, Holmer HK, Ogden LA, Selph SS, Fu R (2012) Conflict of interest disclosures for clinical practice guidelines in the national guideline clearing house. *PLoS One* 7(11):e47343
29. Annane D, Fuchs-Buder T, Zoellner C, Kaukonen M, Scheeren TWL (2018) EMA recommendation to suspend HES is hazardous. *Lancet* 391(10122):736–738
30. Wayne DB, Green M, Neilson EG (2017) Teaching medical students about conflicts of interest. *JAMA* 317(17):1733–1734
31. Austad KE, Avorn J, Kesselheim AS, Lexchin J (2011) Medical students' exposure to and attitudes about the pharmaceutical industry: a systematic review. *PLoS Med* 8(5):e1001037
32. Etain B, Guittet L, Weiss N, Gajdos V, Katsahian S (2014) Attitudes of medical students towards conflict of interest: a national survey in France. *PLoS One* 9(3):e92858
33. Dana J (2003) A social science perspective on gifts to physicians from industry. *JAMA* 290(2):252
34. Yoon JD, Ham SA, Reddy ST, Curlin FA (2018) Role models' influence on specialty choice for residency training: a national longitudinal study. *J Grad Med Educ* 10(2):149–154
35. Leslie K, Lingard L, Whyte S (2005) Junior faculty experiences with informal mentoring. *Med Teach* 27(8):693–698
36. Taherian K, Shekarchian M (2008) Mentoring for doctors. Do its benefits outweigh its disadvantages? *Med Teach* 30: 4:e95–e99
37. Public Health Service, Department of Health and Human Services Grants Policies of General Applicability (2017) Management and reporting of financial conflicts of interest. In: Code Federal of Regulation, Chap I (10–1–17 edn), pp 258–261
38. Scheffer P, Guy-Coichard C, Outh-Gauer D et al (2017) Conflict of interest policies at French medical schools: starting from the bottom. *PLoS One* 12(1):e0168258
39. Carlat DJ, Fagrelus T, Ramachandran R, Ross JS, Bergh S (2016) The updated AMSA scorecard of conflict-of-interest policies: a survey of US medical schools. *BMC Med Educ*. <https://doi.org/10.1186/s12909-016-0725-y>
40. Korn D, Carlat D (2013) Conflicts of interest in medical education: recommendations from the Pew Task Force on Medical Conflicts of Interest. *JAMA* 310(22):2397
41. Borus JF, Alexander EK, Bierer BE et al (2015) The Education Review Board: a mechanism for managing potential conflicts of interest in medical education. *Acad Med* 90(12):1611–1617
42. Ferris LE, Fletcher RH (2018) Conflict of interest in peer reviewed journals: the World Association of Medical Editors (WAME) position on a challenging problem. WAME editorial on conflict of interest. (<http://wame.org/wame-editorial-on-conflict-of-interest>. Accessed on 6 October 2018)
43. Bosch X, Pericas JM, Hernandez C, Doti P (2013) Financial, non-financial and editors' conflicts of interest in high impact biomedical journals. *Eur J Clin Invest* 43(7):660–667
44. The PLoS Medicine editors (2008) Making sense of non-financial competing interest. *PLoS Med* 5(9):e199
45. Morciano C, Basevi V, Faralli C, Boon MH, Tonon S, Taruscio D (2016) Policies on conflicts of interest in healthcare guideline development: a cross sectional analysis. *PLoS One* 11(11):e0166485
46. Neuman I, Karl R, Rajpal A, Akl EA, Guyatt GH (2013) Experiences with a novel policy for managing conflicts of interest of guideline developers. A descriptive qualitative study. *Chest* 144:398–404
47. Brennan TA, Rothman DJ, Blank L et al (2006) Health industry practices that create conflicts of interest. *JAMA* 295:429–433