

Conflicts of interest in electrophysiology and devices presentations

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Aims

Industry collaboration with arrhythmia and devices research is common. However, this results in conflicts of interest (Col) for researchers that should be disclosed. This study aimed to examine the quality of Col disclosures in arrhythmia and devices presentations.

Methods

Recorded presentations from the Arrhythmia & Devices section of the ESC Annual Congress 2016–2020 were assessed. The number of words, conflicts, and time displayed was documented for Col declarations. Meta-data including sponsorship by an industry partner, presenter sex, and institution were obtained.

Results

Of 1153 presentations assessed, 999 were suitable for inclusion. Col statements were missing from 7.2% of presentations, and 58% reported ≥ 1 conflict. Those with conflicts spent less time-per-word on their disclosures (median 150 ms, interquartile range [IQR] 83–273 ms) compared with those without conflicts (median 250 ms, IQR 125–375 ms). One-in-eight presentations were sponsored (12.8%, $n = 128$). Col statements were more likely to be missing in sponsored presentations (14.8%, $n = 19$) compared with non-sponsored presentations (6.1%, $n = 53$), $P = 0.0003$. Sponsored presentations contained a greater median number of Cols (10, IQR 6–18) compared with non-sponsored sessions (1, IQR 0–5), $P < 0.0001$. Time-per-word spent on Col disclosures was 50% lower in sponsored sessions (125 ms, IQR 75–231 ms) compared with non-sponsored sessions (250 ms, IQR 125–375 ms), $P < 0.0001$.

Conclusion

The majority of those presenting arrhythmia and devices research have Cols to declare. Declarations were often missing or displayed for short periods of time. Presenters in sponsored sessions, while being more conflicted, had a lower standard of declaration suggesting a higher risk of potential bias which viewers had insufficient opportunity to assess.

Keywords

Conflicts of interest • Electrophysiology • Research presentations • Industry funding

What's new?

- The majority of arrhythmia and devices presentations contain conflicts of interest
- Declaration of conflicts of interest are generally of poor quality
- Conflict of interest declarations are more likely to be missing in sponsored talks
- In industry-sponsored sessions, where disclosures were displayed, presenters had a greater number of conflicts and displayed them for a shorter time compared with non-sponsored sessions.

Introduction

Industry involvement is common in medical research and clinical innovation. Collaboration with industry has benefitted patients by facilitating the development of new therapies and technologies. However, such interactions result in potential conflicts of interest (Col).¹ Industry interaction and Col are associated with the inappropriate prescribing, disproportionate publication of outcomes that favour sponsors, and poor research methodology.^{2,3} Potential Col are common in cardiology, with approximately 90% of all authors of the 2016 European

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Society of Cardiology Atrial Fibrillation guideline declaring some financial conflict, with similar rates seen for guidelines in heart failure, ischaemic heart disease, and valvular heart disease.⁴ Collaboration between cardiologists and device companies further increases the risk of potential Cols.⁵

There has been a concerted effort to increase transparency surrounding clinician–industry relationships. This has been achieved via numerous methods including the Physician Payments Sunshine Act in the USA,⁶ the Disclosure UK database,⁷ and the adoption of the standardized International Committee of Medical Journal Editors (ICMJE) form by many journals. However, there has been little guidance regarding the formatting of Col in conference settings.

Conference presentations are an influential medium for communicating medical research. Although some conferences make Col declaration slides mandatory, many, including the ESC, provide limited details on the formatting of declaration requirements.^{8–10} The ESC has defined that Col must be declared at the start of all presentations but does not provide clear guidance on the formatting of these declarations.⁸ Furthermore, there is currently no external authority or consensus document to ensure that Cols are declared in an appropriate manner. Previous studies have demonstrated that a large proportion of conference presentations do not contain Col declarations, or that declarations are displayed for too short a time period to be read or understood.¹¹ Declarations are often brief and therefore of debateable value.¹² There has been little analysis of the quality of Col declarations, and it is not known whether the prevalence or quality of Col declarations has improved in recent years.

Given the impact of industry involvement on clinical practice and research methodologies, clarity of Col declarations are particularly important in talks sponsored by industry partners. Col disclosures may be an important way to gauge industry interaction with clinicians and researchers. Furthermore, it is not clear what demographic features are associated with a greater number of conflicts nor if any such features are associated with improved Col disclosure reporting.

This study therefore analysed Col declarations of electrophysiology and devices talks in a large international cardiology conference over a five-year period. This study had the following aims: (1) to determine the overall scope of Cols and the quality of Col disclosures; (2) to determine if sponsorship of talks altered the number of Cols and the quality of the disclosures; (3) whether specific demographic features of speakers altered the number of Cols and quality of Col disclosures.

Methods

Data

Recordings of presentations from the Arrhythmia and Devices section of the European Society of Cardiology (ESC) Annual Congresses 2016–2020 were reviewed through the ESC website (<https://www.escardio.org/>). Presentations were excluded if the original presentation contained no slides, was a panel discussion, was a non-scientific presentation, or part of the presentation was missing. For analyses involving presenter sex, presentations with more than one presenter were excluded.

Presentations were reviewed; the time taken to declare potential Col, the number of words present on the declaration slide, and the presence of any accompanying verbal explanation were all noted. The font size used to declare potential conflicts was determined by calculating the height of capitalized letter as a percentage of the overall slide height, controlling for aspect ratios. Presentation meta-data including content area and presentation type were also recorded.

Academic affiliation of presenters was obtained from the presentation title slide or, if not documented on this slide, from the presenters ESC profile. The ESC profile was similarly used to determine the presenter sex. H-index was used as a proxy of academic seniority. The ESC provides industry partners with the ability to develop a ‘satellite symposia’ in exchange for a fee which provides the industry partner control over the content of the presentations within that session. Sponsorship status was defined by the ESC and is

provided as part of the meta-data for the presentation with a statement that the presentation is ‘Sponsored by ...’.

Session type and topic were defined by the ESC and provided as part of the presentation meta-data. Session types and topics varied over time, these were grouped into generic categories (see [Supplementary material online, Tables S1 and S2](#)).

Quality score

A 12-point metric has previously been developed to quantify the quality of declaration statements.¹² Points were awarded in four categories; including the presence of a verbal explanation, the level of detail provided, whether the declaration slide was displayed for an appropriate amount of time, and whether the font size used was appropriate (see [Supplementary material online, Table S3](#)). Zero to three points were allocated for each of these declaration characteristics.

Statistical analysis

1153 presentations were available for review. Following exclusions (see [Supplementary material online, Figure S1](#)), 999 were included in the main analysis. Results were analysed using SAS 9.3 (SAS Institute, Cary, USA). Frequencies are presented as *n* (%) and continuous variables as median (IQR). Chi-squared and Mann–Whitney U tests were used to assess differences between groups for dichotomous and continuous data, respectively. The Cochran–Armitage test was used to assess the trend between years.

Results

Details of presentations

Our dataset included 999 presentations, approximately one-fifth of presentations were presented by women (22%, *n* = 221, [Table 1](#)). There were 659 unique presenters from 47 countries of which 153 (23%) were women. The median H-index of presenters was 17 (IQR 4–38, *n* = 659).

Conflict of interest declarations

Conflict of interest statements were missing from 7.2% of presentations (*n* = 72). There was a greater proportion of presentations missing Col disclosures in 2020 compared with other years (*P* < 0.0001, [Figure 1](#)) which may be due to the virtual nature of this conference in response to the COVID-19 pandemic. In those with Col disclosures, at least one conflict was reported in 57.1% of presentations (*n* = 529, median conflicts 1, IQR 0–7), there was no evidence of a trend in the number of presentations with conflicts across presentation years (*P* = 0.46, [Supplementary material online, Figure S2](#)).

Quality of Col disclosures

Presenters spent a median of 3 s (IQR 2–4 s) on their Col declarations with a median time-per-word of 214 ms (IQR 125–368 ms). On average, those with conflicts spent ~1 s longer on their Col disclosures (median 3 s, IQR 2–6 s) than those without conflicts (median 2 s, IQR 1–3 s, *P* < 0.0001). However, those with conflicts spent significantly less time-per-word on their Col disclosures (median 150 ms, IQR 83–273 ms) compared with those without conflicts (median 250 ms, IQR 125–375 ms, *P* < 0.0001). Of those with conflicts, 62% (*n* = 327) presented their conflicts for less time than an average person could be expected to read them (250 ms/word).¹³

In only 13.6% of presentations with conflicts (*n* = 72) was any verbal description of the conflicts provided, with a further 66.0% (*n* = 349) only stating ‘these are my conflicts’ or equivalent ([Table 2](#)). While most Col declarations in those with conflicts (87%, *n* = 464) provided written details of the conflict, only 9.2% of Col declarations (*n* = 49) provided a written outline of the relevance of potential conflicts in relation to the specific presentation. In 30% of those with conflicts

Table 1 Baseline characteristics of included presentations

	Presentations
<i>n</i>	999
Presenter sex, n(%)	
Male	778 (77.9)
Female	221 (22.1)
Presentation Topic, n(%)	
Arrhythmias (General)	165 (16.5)
Atrial fibrillation	412 (41.2)
Cardiomyopathy	26 (2.6)
Catheter ablation	115 (11.5)
Device therapy	122 (12.2)
Genetics	21 (2.1)
Rhythm control, non-ablation	12 (1.2)
Syncope and bradycardia	35 (3.5)
Ventricular arrhythmias and sudden cardiac death	82 (8.2)
Session Type, n(%)	
Abstract presentations	212 (21.2)
Case presentations	89 (8.9)
ESC content	64 (6.4)
Expert session	32 (3.2)
General content	263 (25.9)
Original science presentations	166 (16.6)
Sponsored sessions	128 (12.8)
Other	45 (4.5)
Session year, n(%)	
2016	211 (21.1)
2017	180 (18.0)
2018	199 (19.9)
2019	235 (23.5)
2020	174 (17.4)

(*n* = 159), Col disclosures used a font size <24 points making it difficult for the audience to read.

Presenter sex and COIs

There was a significant increase in the proportion of presentations undertaken by women in later session years ($P=0.003$, *Figure 2*). There was no difference in whether Col declaration slides were missing between women (5.9%, *n* = 13) and men (7.6%, *n* = 59), $P=0.38$. In those with Col disclosure slides (*n* = 927), women declared significantly lower median number of Cols (0, IQR 0–3) compared with men (2, IQR 0–8), $P<0.0001$. In those with conflicts (*n* = 529), women spent a similar time-per-word on their Col disclosure slides (150 ms, IQR 84–296 ms) compared with men (147 ms, 81 to 270 ms, $P=0.47$).

Industry sponsorship and Col disclosures

One-in-eight presentations were part of sponsored sessions (12.8%, *n* = 128) with 87 unique presenters. Women presented in far fewer sponsored sessions (*n* = 13, 10.2%) compared with men (*n* = 115, 89.8%, $P=0.0005$). There was evidence to suggest a decreasing proportion of sponsored sessions in more recent years ($P=0.016$,

[Supplementary material online, Figure S3](#)). Presenters in sponsored sessions were likely to be of greater seniority (median H-index 64, IQR 36–99) compared with those in non-sponsored sessions (median H-index 23, IQR 6–45), $P<0.0001$.

Col statements were more likely to be missing in sponsored sessions (14.8%, *n* = 19) compared with non-sponsored sessions (6.1%, *n* = 53), $P=0.0003$. In those with Col disclosure slides, sponsored presentations contained a greater median number of Cols (10, IQR 6–18) compared with non-sponsored sessions (1, IQR 0–5), $P<0.0001$, *Figure 3*.

Time-per-word spent on Col disclosures was 50% lower in sponsored sessions (125 ms, IQR 75–231 ms) compared with non-sponsored sessions (250 ms, IQR 125–375 ms), $P<0.0001$, *Figure 3*. Presenters at sponsored sessions were much less likely than those at non-sponsored sessions to provide sufficient verbal details of their conflicts (0 vs. 8.5% respectively, $P=0.0008$).

Country of presenter and Col disclosure

When limited to unique presenters (*n* = 659), the country of the presenter did not alter the likelihood of having a Col disclosure slide ($P=0.30$). However, the likelihood of reporting a conflict did differ by country ($P<0.0001$, [Supplementary material online, Figure S4](#)). In those reporting conflicts, the country of the presenter was associated with the median number of conflicts ($P=0.02$, [Supplementary material online, Figure S5](#)). In those with Col disclosure slides (*n* = 927), the proportion of presentations that were sponsored differed substantially by presenter's country ($P<0.0001$).

Seniority and Col disclosures

When limited to unique presenters with a Col disclosure (*n* = 609), those with reported conflicts were likely to have a greater H-index (median 30, IQR 11–55) than those without reported conflicts (median 8, IQR 2–24, $P<0.0001$, *Figure 4*). Greater H-index was associated with a greater number of conflicts (Beta = 0.10, 95% CI 0.08–0.12, $P<0.0001$). However, H-index was not associated with time-per-word spent on the Col declaration slide (Beta = 0.00, 95% CI 0.00–0.00, $P=0.14$).

Discussion

In this analysis of a large cardiology conference over a five-year period, a substantial proportion (7.2%) of presentations were missing Col disclosures. Cols were often presented poorly; with 62% of disclosures being displayed for less time than required for the average viewer to read, 86% lacking any verbal explanation, and 30% being presented in a small font. Women and men were equally as likely to omit Col disclosure slides, however, women had significantly fewer potential Cols compared to men. Col statements were more likely to be missing in sponsored sessions, and the quality of declarations in sponsored sessions was generally poorer. Presenter seniority (using H-index as a surrogate) was associated with an increased number of potential conflicts, but no difference in declaration quality.

The absence of Col declarations in a substantial number of presentations is notable, as viewers are not able to interpret the presented research in an appropriate context. An analysis of Col declarations from the 2016 ESC Congress demonstrated that 4.9% of presentations did not contain a Col declaration.¹⁴ This is comparable to our findings over a five-year period and suggests that there has not been improvement by the ESC in enforcing the presence of declaration slides. However, evidence from other specialties suggests that Col declarations are absent in 10–29% of conference presentations.^{11,15} As such, while the absence of Col declaration remains problematic, cardiology as a specialty and the ESC as an organization may be performing better than others.

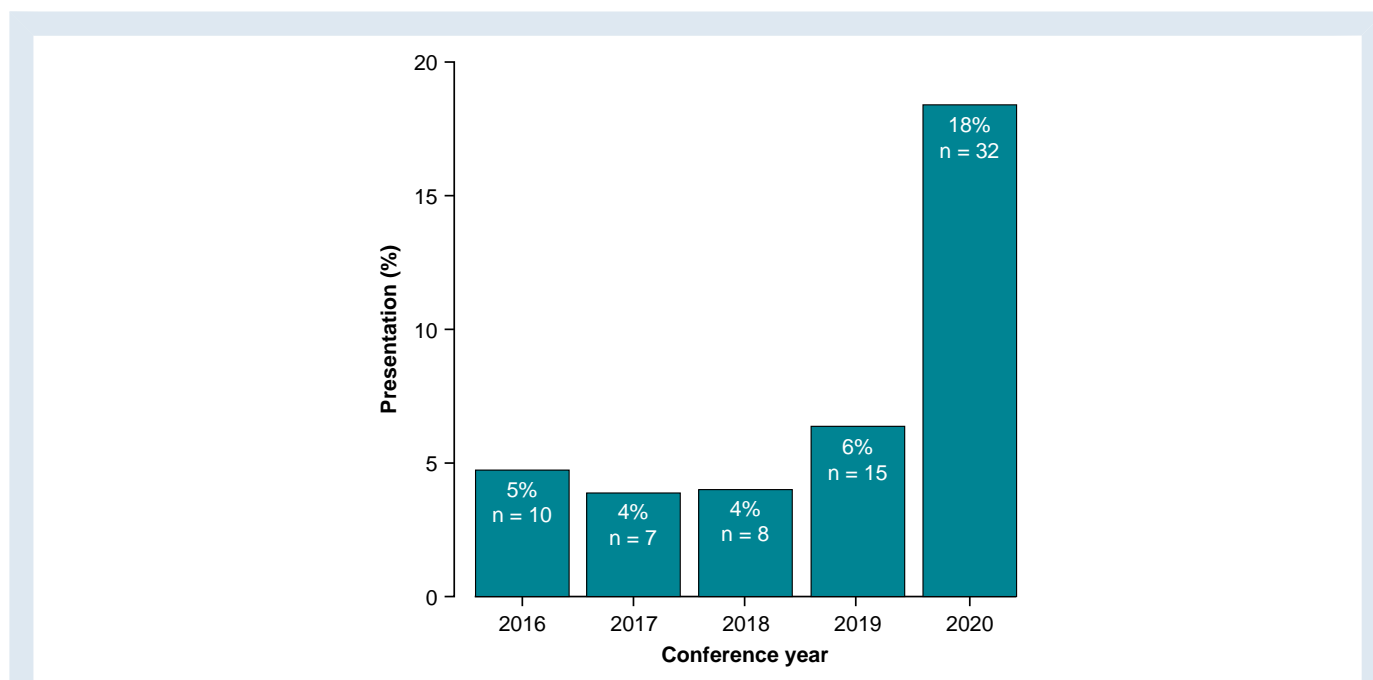


Figure 1 Bar plot demonstrating the rates of missing conflict of interest disclosure slides by ESC congress year. Bars present the percentage of presentations missing a disclosure slide.

Table 2 Quality of conflict of interest disclosures

Score	Verbal	Detail	Font size	Time
0	393 (39.3)	48 (4.7)	25 (2.5)	72 (7.2)
1	485 (48.6)	10 (1.0)	271 (27.1)	441 (44.1)
2	52 (5.2)	482 (48.3)	524 (52.5)	389 (38.9)
3	69 (6.9)	459 (46.0)	179 (17.9)	97 (9.7)

We identified that there was an increase in the proportion of missing disclosure slides in 2020 when compared to other years analysed (18% vs. 4–6% in other years). The reasons behind this finding are not immediately clear. However, it should be noted that in 2020 the ESC annual congress moved online in response to the COVID-19 pandemic.¹⁶ It may be that the move to online presentations resulted in decreased presenter awareness of the need for Col disclosures. If so, with conferences returning to either face-to-face or 'hybrid' formats, it would be expected that such a pattern would reverse.

Women were under-represented in the Devices and Electrophysiology section of this large cardiology conference, with only 22% of presentations being from women. Across Europe, only 34% of all cardiologists are female.¹⁷ This understandably translates to fewer female presenters at conferences but highlights the need to address the significant gender imbalance within the specialty. Interestingly, we found that men had more potential Cols than women. This may be a reflection of the disproportionate allocation of research funding and leadership opportunities between men and women,¹⁸ this hypothesis is further supported by our finding that women presented fewer industry-sponsored presentations than men.

While appearing to decrease in frequency over time, a significant number of presentations at these conferences were sponsored by the industry. Sponsorship of medical research by industry is known

to be associated with the selective publication of results, and the over-presentation of supportive results.³ This has been demonstrated in numerous clinical trials, including trials for antidepressants,¹⁹ Alzheimer's drugs,²⁰ and gabapentin.²¹ As a result, there is inherently a greater potential for conflicts in sponsored sessions. This is supported by evidence that presenters of sponsored presentations had a greater number of declared conflicts of interest. The finding that fewer sponsored presentations displayed a Col disclosure slide is also important, as is the evidence that declaration slides were displayed for a shorter period and a greater proportion lacked verbal explanation. This finding may represent an attempt from presenters to 'gloss over' industry relationships, to maintain a positive relationship with the (potentially numerous) industry sponsors they are associated with.

As expected, senior researchers (as defined by H-index) had a greater number of reported Cols. Despite this, seniority was not associated with a better quality of Col declarations compared with their junior counterparts. Without improved performance from senior researchers, junior researchers may lack guidance on Col disclosures, which is not conducive to improving industry transparency in the future.

Some authors may consider only reporting conflicts which they believe to be 'relevant' to the presentation. However, such a judgement is inherently subjective. Additionally, as many reported conflicts list only a company name the ability to consider relevance to a specific presentation is limited. The ESC is clear that all potential conflicts are reported during the presentation.²² Audience members should ideally be provided with sufficient information to decide for themselves whether such conflicts are relevant to the presentation.

The findings here relate specifically to arrhythmia and devices talks at the ESC annual congress. While deficiencies have been identified in the declaration of Cols in these presentations, this is not to suggest that the ESC or the electrophysiology and devices community are particularly poor. Indeed the ESC has demonstrated a commitment to improving the transparency of potential Cols for ESC staff, officers, and scientific contributions/presenters.^{8,23} However, while the quality of Col disclosures relative to other conferences and sub-specialties is not clear, the

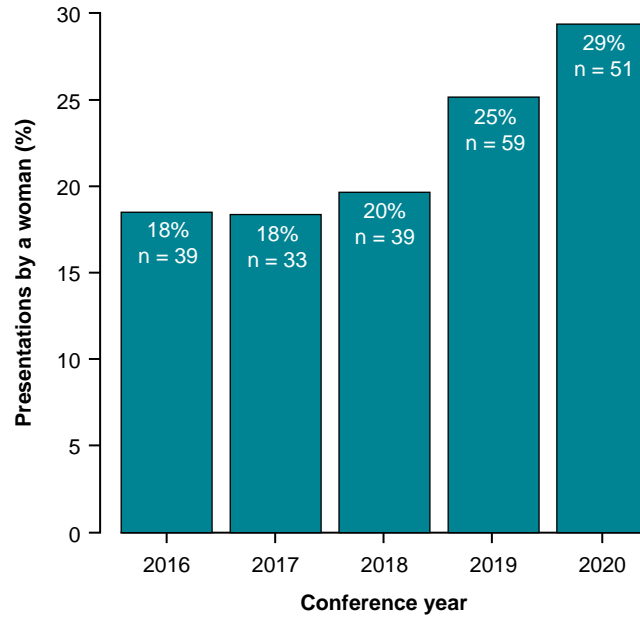


Figure 2 Bar plot demonstrating the rates of presentations presented by women by ESC congress year.

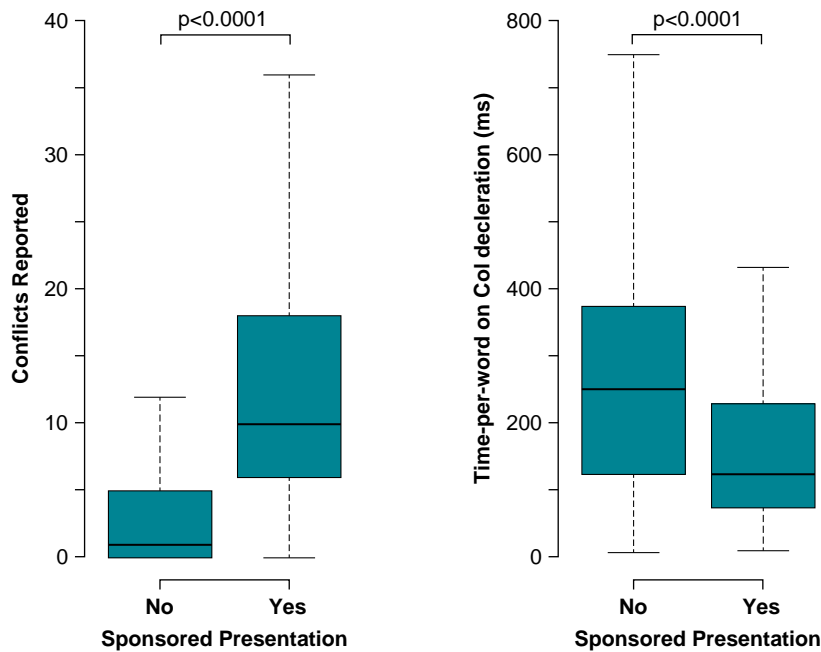
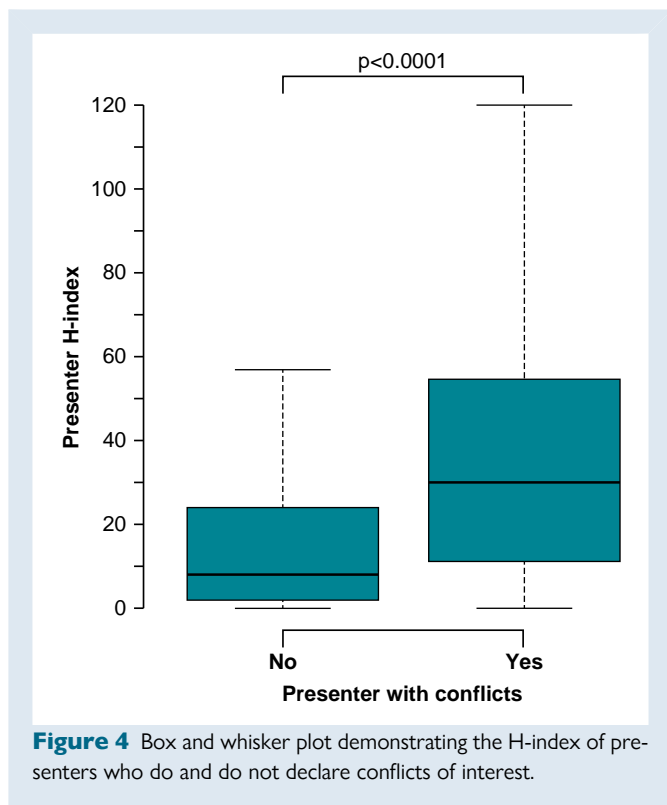


Figure 3 Box and whisker plot demonstrating the number of conflicts reported by presenters (left) and time-per-word spent on declaration slides (right) of sponsored and non-sponsored presentations.

absolute deficiencies identified here demonstrate that further improvements are required to ensure the sufficient transparency of presenter conflicts for audience members.

Many presentations at international conferences are time limited. As such, time spent declaring Col's inherently reduces time that can be spent on the remainder of the presentation. Such situations may lead

presenters to rush through a description of their conflicts. The ESC is clear that presenters must show their Col slide for long enough to ensure that the audience has time to read the contents.²⁵ As such, it is imperative to consider how this can be overcome. One option would be to exempt the time spent on Col disclosures from the presentation time starting the 'clock' only after the declaration was completed.



Alternatively, the disclosure could be displayed throughout the presentation on a separate screen.²⁴ Col declarations could be displayed for a minimum period of time (e.g. 10 s); however, this is likely to be far too long for presenters without any Cols to declare and may remain too short for those with a large number of potential conflicts.

This work demonstrates that many Col declarations are currently not fit-for-purpose, and further strategies should be adopted to increase transparency. To address many of the underlying causes of poor declarations, presenters could submit their potential conflicts to a centralized system which auto-populates Col slides. The ESC maintains such a database which could be utilized.⁸ This would allow the ESC to meet its commitment that all presenters should declare Cols directly on the materials presented.²⁵ In addition, this centralized data could be placed in the conference programme or made available online with the speaker biography (e.g. on ESC365: <https://esc365.escardio.org/home>). Such a standardized system would be able to be reviewed at audience members' discretion in real time in relation to each presentation. Col slides should also be displayed for a minimum time that is determined by the number of conflicts reported. This would address key issues such as conflicts being declared too quickly, inconsistent formatting, ambiguity regarding what should be declared, and the requirement for audiences to recall declaration statements as potential conflicts become relevant throughout the talk.

Strengths and limitations

This study has several strengths including its large size and collection of a substantial range of meta-data values. However, a number of limitations must be acknowledged. It is not possible to know whether presenters declared all of their Cols as no gold-standard central repository for Col declarations exists. Additionally, as data are taken from a series of annual conferences from the same organization, this may limit the external applicability of this study.

Conclusion

Potential Cols are common within Electrophysiology and Device Therapy cardiology, given how intertwined pharmaceutical and device companies are with routine clinical practice and research. While there has been a previous emphasis on the presence of Col declarations, this analysis demonstrates the need to interrogate the quality of these declarations, in order to ensure that they are fit-for-purpose. Further efforts should be made to ensure that potential Cols are declared properly in sponsored conference presentations, given their close association with the industry.

Supplementary material

Supplementary material is available at *Europace* online.

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Conflict of interest: The authors declare no conflicts of interest in relation to this work.

Data availability

The data underlying this research is available upon reasonable request to the corresponding author.

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