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Conflict of interest between Professional Medical Societies and industry: an analysis of the Italian Medical Societies' websites

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Conflict of interest between Professional Medical Societies and industry: an analysis of the Italian Medical Societies' websites

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ABSTRACT

Objective To describe how Italian medical societies interact with pharmaceutical and medical device industries through an analysis of the information available on their websites.

Design Cross sectional study.

Setting Italy.

Participants One hundred and fifty-four medical societies registered with the Italian Federation of Medical-Scientific Societies.

Main outcome measures Indicators of industry sponsorship (presence of industry sponsorship in the program of the last medical societies' annual conference; presence of manufacturers' logos on the homepage; presence of industry sponsorship of satellite symposia during the last annual conference).

Results One hundred and thirty-one Italian medical societies were considered. Of these, 4.6% had an ethical code covering relationships with industry on their websites, while 45.6% had a statute that mentioned the issue of conflict of interest, and 6.1% published the annual financial report. With regard to industry sponsorship, 64.9% received private sponsorship for their last conference, 29.0% had manufacturers' logos on their webpage, while 35.9% had industry-sponsored satellite symposia at their last conference. The presence of an ethical code on the societies' websites was associated with both an increased risk of industry sponsorship of the last conference (RR 1.36, 95% CIs 1.15 to 1.61 after adjustment) and with presence of industry logo on the societies' websites (RR 1.36, 95% CIs 1.15 to 1.61 after adjustment). No association was observed with the other indicators of governance and transparency.

Conclusions This survey shows that industry sponsorship of Italian medical societies' conferences is common, while the presence of a structured regulatory system is not. Disclosure of the amount of industry funding to medical societies is scarce. The level of transparency therefore needs to be improved and the whole relationship between medical societies and industry should be further disciplined in order to avoid any potential for conflict of interest.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- To our knowledge, this is the first assessment of the relationship between Italian medical societies and pharmaceutical and medical device industries.
- A systematic approach was used to explore the medical societies' websites; data on societies' policies on governance and transparency were independently collected by two coders.
- With regard to the limitations, we relied only on information disclosed in the medical societies' websites without any further Internet searches, nor we performed a quality assessment of websites.
- The study has an Italian focus and we acknowledge that an international comparison would have been fundamental in order to ensure generalizability to our findings.

INTRODUCTION

Professional Medical Societies play an important role in advancing the quality of medical care through the development of clinical practice guidelines that shape clinical practice, dissemination of information through the publication or sponsorship of a journal, funding of research projects and the organization of educational conferences and continuing medical education (CME) events.[1,2] Moreover, medical societies advocate for the interest of their practitioners as the *"voice of the profession"*.[3]

Both pharmaceutical and medical device industries extensively fund several activities carried out by medical societies.[1,2] Industries especially subsidize annual meetings and CME events, purchasing advertising spaces, funding physicians' attendance to these courses and sometimes, as the Institute of Medicine (IOM) points out, influencing the *"choice of topics and content*".[4]

During the past decades, an extensive literature has investigated the relationship between physicians and both pharmaceutical and medical device industries and has shown that some kinds of interaction could unduly influence professional judgments leading to the potential for bias and conflict of interest (COI).[4,5] A growing body of literature has also investigated the issue of conflict of interest applied to medical societies rather than to individual physicians and some researchers have made important recommendations for change.[1-3,6-8] Particularly, strong recommendations have been made with regard to industry sponsorship of congresses due to the possibility for the sponsor to bias the educational content of the event thus influencing doctors' prescribing habits.[1] Changes have been proposed also for the organisation of satellite symposia: current recommendations suggest to clearly mark them as industry sponsored sessions and keep them separated both in space and time from the main event they parallel.[1]

Following these recommendations, several medical societies have adopted specific institutional policies governing their relationships with industry.[9-12]

However, these are mainly US-based articles and case studies while little is known about the relationships between industry and medical societies in Europe, and particularly in Italy where this topic is still a grey area of research.

The present study aims therefore at describing how Italian medical societies interact with pharmaceutical and medical device industries through an analysis of the information available on their websites. In particular we aim to provide a description of the societies' policies on transparency and governance and of the extent of industry sponsorship on their activities. Furthermore, we explore possible associations between medical societies' policies and practices.

METHODS

Study design and data collection

In order to explore the relationship between Italian medical societies and pharmaceutical and medical device industries, we carried out a cross-sectional study. We searched the websites of all medical societies registered with the Italian Federation of Medical-Scientific Societies (FISM) between January and September 2014. The Federation includes societies operating in the medical or scientific field that are involved in research or professional medical education activities and have been operating in Italy at the national level for at least 3 years.[13]

From each website we collected the following information (yes/no questions):

- the presence of an ethical code, defined as a statement specifically regulating medical societies' behavior in case of industry sponsorship;

- whether the medical societies' statute mentioned the issue of COI;
- the publication of the annual financial report on the website;
- the presence of pharmaceutical or medical device companies' logos on the homepage;
- the presence of pharmaceutical or medical device industry sponsorship in the program of the last medical societies' annual conference;
- the presence of industry sponsorship of satellite symposia during the last annual conference.

With regard to the last two criteria, by last annual conference we meant an event that had been organized within the previous 12 months; this was also considered a proxy of how updated the websites were.

Data were independently extracted by five trained medical residents in Public Health and one trained Medical student, with duplicate independent coding of all data. A systematic approach was used to explore the websites and collect data on the medical societies' policies on governance and transparency. After the data collection, coders met to resolve disagreements and reach consensus. Statistical analyses were performed using the final information obtained after consensus. All analyses were performed using Stata 12.1 SE.

Statistical analyses

Our main purpose was to provide a detailed descriptive analysis of the relationship between Italian medical societies and the pharmaceutical and medical device industries. Categorical variables were described using frequency tables. Cross tabulations were performed for evaluating possible associations between industry sponsorship in the program of the last congress, industry sponsorship of satellite symposia and presence of manufacturers' logos on medical societies'

websites using chi-square or Fisher exact test, as appropriate.

As a second step, we aimed to explore the relationship between medical societies' regulatory systems in terms of policies on governance and transparency (i.e. the presence of an ethical code, the presence of a statute covering relations with industry, the publication of the annual financial report on the website) and their consequent behaviors. Our main outcome was the presence of pharmaceutical or medical device industry sponsorship in the program of the last annual conference. Moreover, while recognizing that the conference sponsorship might be considered a stronger sign of corporate influence, satellite symposia - whether not sufficiently regulated as proposed by Rothman - might as well undermine the scientific integrity of the main meeting they parallel.[1] Therefore we performed sensitivity analyses evaluating the presence of industry sponsorship in the program of the last annual conference either/or of satellite symposia.

As a secondary outcome we explored the relationship between medical societies' regulatory systems and the presence of industry logos on medical societies' websites. Possible predictors were the presence of an ethical code, of a statute regulating COI and the publication of the annual financial report on the website.

Medical societies were divided into three main categories (surgical – those for which the main activity is a surgical intervention on the patient, i.e. cardio-surgery; clinical – those for which the main activity is to provide non-surgical treatment to the patients, i.e. cardiology; services – those for which the main activity is to support/make possible the activities of the previous areas, i.e. radiology, hygiene and public health), according to the official definition provided by the Italian Ministry of Education, Universities and Research [14], which were used as adjustment variables. We performed stratified analyses within each specialty in order to identify possible differences between the three groups. Because of the high prevalence of industry sponsorship in the program

of the last annual conference, we used Poisson regression to estimate relative risks.[15] Results are presented as RR with 95% CI.

RESULTS

A detailed description of the medical societies included in the survey can be found in Table 1.

Table 1. Description of Professional Medical Societies included in the survey

	All sample (n=131)	*Only services (n=42)*	*Only medical (n=59)*	*Only surgical (n=30)*
	%	**%**	**%**	**%**
Transparency and governance				
Ethical code covering relations with industry	4.6	2.4	3.4	10.0
Statute covering relations with industry	45.6	38.1	54.2	40.0
Annual financial report on website	6.1	4.8	5.1	10.0
Industry sponsorship				
Manufacturers' logos on the website	29.0	23.8	25.4	43.3
Industry sponsorship in the program of the last annual conference	64.9	57.1	69.5	66.7
Industry sponsorship of satellite symposia	35.9	40.5	39.0	23.3

Industry sponsorship in the program of the last annual conference OR satellite symposia	67.2	61.9	71.2	66.7
Type of society				
Services	32.1	--	--	--
Clinical	45.0	--	--	--
Surgical	22.9	--	--	--

Type of societies

In 2013, 154 Medical Societies were registered with FISM, 23 of which were excluded from our analysis because information on the outcome was not available (i.e. the website was not accessible or it was not possible to retrieve a detailed program of the last annual conference). Of the remaining 131, 42 (32.1%) were from the services, 59 (45.0%) from the clinical and 30 (22.9%) from the surgical area.

Transparency and governance

Only 4.6% of the medical societies had an ethical code covering relations with industry on their websites, while less than half (45.6%) of the statutes mentioned the issue of COI, and only 6.1% published the annual financial report.

Industry sponsorship

Almost one third (29.0%) of medical societies had manufacturers' logos on their webpage, with the highest frequency registered in the surgical category (43.3%). Two thirds (67.7%) of medical

societies had either their last conference or satellite symposia sponsored by industry; in particular 64.9% of these had a private sponsorship of their last conference, while 35.9% had industry-sponsored satellite symposia at their last conference. Satellite symposia were always organized within the conference, and were held either in series or parallel to the main session. This means there was no clear separation in time, as mentioned by Rothman.[1] As for the separation in space, in most cases it was impossible to retrieve this information from the conference program, since locations were not always listed.

We observed an association between having industry sponsorship of the last conference and of satellite symposia (chi-square test: $p<0.0001$), but not between having a private sponsorship of the last conference and the presence of manufacturers' logos on the websites ($p=0.132$).

Relationship between medical societies' policies and funding of annual meetings

Table 2 summarizes the findings of an exploratory analysis on the association between medical societies' policies on transparency and governance and the industry sponsorship of their last annual conference.

Table 2. Relative risks of having pharmaceutical or medical device industry sponsorship in the program of the last medical societies' annual conference

	All sample (n=131)		*Only services (n=42)*		*Only clinical (n=59)*		*Only surgical (n=30)*	
	crude RR	*adjusted RR*	*crude RR*	*adjusted RR*	*crude RR*	*adjusted RR*	*crude RR*	*adjusted RR*
Ethical code	1.39 (1.23-1.57)	**1.36 (1.15-1.61)**	1.74 (1.33-2.28)	1.13 (0.92-1.40)	1.23 (1.07-1.41)	**1.17 (1.02-1.34)**	1.29 (1.03-1.63)	1.50 (0.93-2.41)
Statute	1.16 (0.91-1.47)	1.13 (0.90-1.42)	1.67 (0.94-2.94)	**1.93 (1.14-3.28)**	0.86 (0.67-1.12)	0.89 (0.71-1.12)	1.18 (0.74-1.89)	1.31 (0.76-2.25)
No annual financial report on website	1.29 (0.67-2.48)	1.31 (0.69-2.48)	1.28 (0.31-.32)	1.34 (0.50-3.58)	1.71 (0.42-6.96)	1.71 (0.39-7.53)	1.17 (0.50-2.73)	1.31 (0.55-3.10)
Type of society								
Services	1	1	-	-	-	-	-	-
Clinical	1.40	**1.36**	-	-	-	-	-	-

	(1.05-1.87)	**(1.04-1.78)**						
Surgical	1.31 (0.94-1.84)	1.32 (0.93-1.86)	-	-	-	-	-	-

Within the whole sample, interestingly the presence of an ethical code on the societies' websites was associated with an increased risk of industry sponsorship of the last conference (crude RR 1.39, 95% CIs 1.23 to 1.57; RR 1.36, 95% CIs 1.15 to 1.61 after adjustment). The presence of a statute covering relations with industry showed no association with the risk of having the last conference sponsored by industry when looking at both the crude (RR 1.16, 95%CIs 0.91 to 1.47) and the adjusted RR (1.13, 95%CIs 0.90 to 1.42). The absence of the annual financial report on the website did not show any association with industry sponsorship of the last conference either (crude RR 1.29, 95%CIs 0.67 to 2.48; adjusted RR 1.31, 95%CIs 0.69 to 2.48). Compared to societies in the services field, an increased risk was observed for clinical (adjusted RR 1.36, 95%CIs 1.04 to 1.78) but not for surgical societies (RR 1.32, 95%CIs 0.93 to 1.86). Finally, we observed no specific pattern between the presence of a statute covering relations with industry, the presence of an ethical code, or financial transparency, and the risk of industry sponsorship within each type of society, despite finding an increased risk of industry sponsorship associated with the presence of an ethical code within the clinical group, and with the presence of a statute within the services group.

When we repeated the analysis using the composite outcome "private sponsorship of the last

conference or satellite symposia", no major differences were observed (Supplementary Table 1). However, RRs were generally lower, possibly indicating a misclassification of the outcome.

Supplementary Table 1. Relative risks of having pharmaceutical or medical device industry sponsorship in the program of the last medical societies' annual conference or satellite symposia

	All sample (n=131)		*Only services (n=42)*		*Only clinical (n=59)*		*Only surgical (n=30)*	
	crude RR	*adjusted RR*	*crude RR*	*adjusted RR*	*crude RR*	*adjusted RR*	*crude RR*	*adjusted RR*
Ethical code	1.34 (1.20-1.50)	**1.35 (1.14-1.58)**	1.60 (1.25-2.04)	0.92 (0.67-1.26)	1.20 (1.06-1.36)	1.15 (1.02-1.29)	1.29 (1.03-1.63)	1.42 (0.88-2.29)
Statute	1.24 (0.98-1.56)	1.22 (0.98-1.51)	1.94 (1.15-3.29)	1.90 (1.12-3.21)	0.90 (0.70-1.15)	0.90 (0.72-1.12)	1.18 (0.74-1.89)	1.25 (0.73-2.15)
No annual financial report on website	1.34 (0.70-2.57)	1.38 (0.74-2.55)	1.28 (0.31-5.32)	1.34 (0.50-3.58)	1.71 (0.42-9.96)	1.71 (0.39-7.53)	1.17 (0.50-2.73)	1.31 (0.55-3.10)
Type of society								
Services	1	1	-	-	-	-	-	-

Clinical	1.32 (1.02-1.72)	1.25 (0.96-1.62)	-	-	-	-	-	-
Surgical	1.21 (0.89-1.66)	1.21 (0.88-1.66)	-	-	-	-	-	-

Relationship between medical societies' policies and presence of manufacturers' logos on the website

Table 3 shows the results of an exploratory analysis on the association between medical societies' policies on transparency and governance and the presence of manufacturers' logos on their websites. We observed similar findings as for industry sponsorship of the last annual conference. The presence of an ethical code and the absence of a financial report on the website were associated with an increased risk of having industry logos on the website, while no association was observed in presence of a statute covering relations with industry.

Table 3. Relative risks of having manufacturers' logos on medical societies' websites.

	All sample (n=131)		***Only services (n=42)***		***Only clinical (n=59)***		***Only surgical (n=30)***	
	crude RR	***adjusted RR***	***crude RR***	***adjusted RR***	***crude RR***	***adjusted RR***	***crude RR***	***adjusted RR***
Ethical code	1.79	**1.36**	4.55	**4.67**	2.11	1.91	0.72	0.61

	(0.76-4.21)	**(1.15-1.61)**	(2.54-8.17)	**(1.69-12.91)**	(0.48-9.27)	(0.41-8.88)	(0.13-3.88)	(0.11-3.42)
Statute	0.97 (0.53-1.75)	1.13 (0.90-1.42)	1.67 (0.42-6.52)	1.36 (0.31-5.87)	0.96 (0.38-2.41)	0.91 (0.37-2.29)	0.71 (0.27-1.91)	0.61 (0.23-1.63)
No annual financial report on website	$>10^6$ ($>10^6$->10^6)*	$>10^6$ ($>10^6$-$>10^6$)*	$>10^6$ ($>10^5$-$>10^6$)*	$>10^6$ ($>10^5$->10^6)*	$>10^6$ ($>10^5$-$>10^6$)*	$>10^6$ ($>10^5$-$>10^6$)*	NC	NC
Type of society								
Services	1	1	-	-	-	-	-	-
Clinical	1.09 (1.54-2.18)	**1.36 (1.04-1.78)**	-	-	-	-	-	-
Surgical	1.82 (0.92-3.60)	1.32 (0.93-1.86)	-	-	-	-	-	-

* No societies with an available annual financial report had a logo on their website.

NC: non calculable because of 0 count cells

DISCUSSION

To our knowledge, this is the first assessment of the relationship between Italian medical societies and pharmaceutical and medical device industries. We provided an overview of the type of industry support and of the policies implemented by medical societies in order to face the issue of COI, showing how common is the industry sponsorship of medical events and how uncommon is the presence of a structured regulatory system.

Transparency

According to the data presented in Table 1, there seems to be a general lack of transparency: only 6.1% of all the societies included in our study shared information on their financing. Since medical societies are not required to disclose this information, the amount of industry funding is often unknown. Full disclosure and complete transparency in the relationship between industry and medical societies is a fundamental step for the credibility of both of them and the USA Physician Payments Sunshine Act sets an interesting precedent.[16] We therefore urge Italian governmental agencies to require a public disclosure of manufacturers' funding to physicians, medical societies and health care providers and strictly monitor the completeness, accuracy and accessibility of the information provided.

However, even if transparency is the main strategy internationally adopted to face the issue of COI, it seems to have some limits. According to our data, even when medical societies are more transparent this doesn't seem to have an impact on their consequent behaviors in terms of industry sponsorship of their conferences.

This leads to a reflection on the limits of the strategies to address COI that focus merely on transparency. Even if the disclosure makes others aware of the presence of a COI, it doesn't seem to be a sufficient protection and according to some authors, it might also have *"significant adverse effects"* through several mechanisms such as creating the wrong feeling that once the COI is declared, there is no need to manage it.[12,17] As Loewenstein points out, the issue to be considered "*should not be whether to disclose but how to ensure that disclosure has its intended effects*".[17]

Relationship between policies and practices

We conducted an exploratory analysis on the association between medical societies' policies and their consequent behaviors in terms of industry sponsorship in the program of the last annual conference and presence of manufacturers' logos on their websites. We found that the presence of an ethical code is associated with both industry sponsorship in the program of the last annual conference and with presence of manufacturers' logos on the societies' websites, while we observed no association with the presence of a statute covering relations with industry.

There could be two different interpretations of these data and due to the cross-sectional nature of our study that is not meant to establish causal relationships, none of them can be excluded.

On one hand, it seems that the societies with higher level of industry sponsorship of their conferences are more likely to have ethical codes, and this might be expected because having these relationships with manufacturers, they could feel a need to govern them. Therefore, the regulation might be a consequence of their relationship with industry. Whatever the direction, it seems that the presence of a regulation or ethical code is not a protective factor with regard to

industry sponsorship. There could be different explanations for this phenomenon: firstly, codes and regulations may not be stringent or effective enough to prevent - or at least manage - the COI. Secondly, there may be a lack of monitoring and vigilant enforcement of these guidelines once they are developed. It is also worth pointing out that we evaluated whether medical societies mentioned the issue of COI but didn't analyse how they conceived it, therefore there might be a different meaning for conflict of interest in their ethical codes or statutes. However, although it was not an objective of this study, it is worth emphasizing that in reviewing medical societies' statutes and ethical codes we generally found no clear definitions of COI and except for a few cases with very detailed regulation, there was usually a quite general reference to the issue.

Therefore, looking at the consequent behavior of medical societies (e.g. the private sponsorship of their conferences) the following question emerges: is there any perception that private sponsorship of a medical education event itself creates a conflict of interest? As several authors state, COI is a condition and not necessarily a behavior and the bias created by COI is often very subtle, unconscious and unintentional.[18] Using the medical education events as a case study, a growing amount of literature has shown that industry-sponsored educational events are biased toward the product of the sponsor and might influence physicians' prescribing habits.[19,20]. According to our data, it does not seem that the industry-sponsorship of societies' medical education events is perceived by these societies as a conflict of interest situation that might undermine their integrity and independence.

What can be done

Public disclosure of financial relationships between physicians, medical societies, health care providers and manufacturers is of course a needed step and we call upon our Government to make it a mandatory requirement. However, in order to face such a problem we need to be bold enough to rethink the whole relationship between physicians and industry. We understand this will require a huge cultural change but it is time to start demythologizing some of the most accepted paradigms like the idea that it is not possible to organize medical education events without any industrial sponsorship.[21] There are already examples of medical societies who have made interesting and bold attempts both at the national and at the international level.[9,10,12] With regard to Italy, it is worth highlighting that the Pediatricians' Cultural Association (Associazione Culturale Pediatri, ACP), the Italian Society of Migration Medicine (Società Italiana Medicina delle Migrazioni, SIMM) and the Italian Secretariat of Medical Students, the biggest association of Medical students in Italy, have adopted stringent ethical codes on COI and have been organizing their annual conferences without industry-sponsorship.[22-24] These few but extremely positive examples could provide a template for other medical societies to transform their mode of operation and to "*reduce commercialism and restore professionalism to our medical meetings"*.[8]

Limitations

Our study has a number of limitations. First of all, this is a cross-sectional study, and as so it is not intended for establishing causal relationships. We can only describe the associations we observed but we cannot exclude they are spurious, nor we can state whether industry sponsorship is the result of the absence of an ethical code regulating COI or vice versa. Moreover, we

decided to rely only on information disclosed in the medical societies' websites without any further Internet searches, nor we performed a quality assessment of websites. It is possible that those who designed a low quality or not well structured website were more likely to underestimate the importance of publishing an ethical code or a statute, but actually had one, rather than those who set up a well structured or better updated website. Therefore we cannot exclude a certain amount of imprecision in our results. Moreover, we didn't quantify the proportion of funding given by industry on the total amount of funds, which could be an important indicator of their independence from the sponsor. Finally, in order to group the medical societies, we used the categorization provided by the Italian Ministry of Education, Universities and Research. The societies analysed in our survey cover a wide range of medical specialties and in particular, the societies belonging to the "service" category are quite heterogeneous (e.g. Public Health Societies, Anesthesiologists' or Radiology Societies). This heterogeneity may have affected some comparisons among the different categories and may have been responsible for the observed lower risk of industry sponsorship in the "services" category, where we grouped many societies, which probably base their existence on stronger ethical values.

CONCLUSIONS

The interaction between medical societies and industry has come under increasing scrutiny over the last decades. While recognizing the importance of appropriate forms of collaboration between physicians and pharmaceutical industries, we strongly believe that, as Schofferman states, the potential values of these collaborations do not mitigate their potential risks: these

relationships *"are conflicted by their very nature and have the potential to create unconscious bias that might influence patient care"*.[12]

We hope our analysis of the current Italian medical societies' relationship with industry might be a first step in order to stimulate a reflection on this controversial issue in our country. In this perspective, we aim to use this survey as an advocacy tool for a debate that we, as residents and doctors in training, would like to launch among our medical societies.

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CONTRIBUTORS

AF, DT, FN, AL, FG, AR conceived the study. AR designed the data collection tool and coordinated the data collection. FF, FG, DI, CL, ES, AR collected the data. GG, AR, AF planned the statistical analysis and GG analysed the data. AF, GG, AR wrote the first draft of the paper. DT, FN, AL contributed to the writing of the paper. All authors critically revised the manuscript and approved the final version. AF is guarantor.

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COMPETING INTERESTS

All authors have completed the ICMJE disclosure form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years. DT, FF, DI, AR, GG, FG, ES are members of the Italian Society of Hygiene, Preventive Medicine and Public Health (S.It.I.). S.It.I is one of the medical societies that were evaluated in our research.

ETHICAL APPROVAL

Not required.

DATA SHARING

The dataset is available as Supplementary File.

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Number	Medical Societies	Categories	Presence of et	Logos on the	Annual Financia	Industry spons
1	Academy of Emergency	medical	absent	absent	absent	present
2	Associazione Dermatolo	medical	absent	absent	absent	present
3	Associazione Italiana di A	medical	absent	absent	absent	present
4	Associazione Italiana di (	medical	absent	absent	absent	present
5	Associazione Italiana di (	medical	absent	absent	present	missing
6	Associazione Italiana Ga	medical	missing	present	absent	missing
7	Associazione Italiana Ne	medical	absent	present	absent	present
8	Associazione Italiana Pe	medical	missing	missing	missing	missing
9	Associazione Italiana pe	medical	absent	absent	absent	present
10	Associazione Italiana Pn	medical	absent	absent	absent	present
11	Associazione Italiana Ulc	medical	absent	absent	present	present
12	Associazione Medici Dial	medical	absent	absent	absent	present
13	Associazione Medici Enc	medical	absent	present	absent	present
14	Associazione Nazionale	medical	absent	absent	absent	present
15	Associazione Neurologic	medical	absent	absent	absent	present
16	Associazione Societa' Sc	medical	absent	absent	absent	missing
17	Collegio Reumatologi Os	medical	absent	absent	absent	missing
18	Federazione Centri per la	medical	absent	present	absent	present
19	Federazione Italiana Ass	medical	absent	present	absent	present
20	Federazione Italiana dell	medical	absent	absent	absent	present
21	Federazione Italiana Me	medical	absent	absent	absent	missing
22	Gruppo Italiano per lo St	medical	absent	absent	absent	present
23	Gruppo Oncologico dell'I	medical	absent	present	absent	present
24	International Italian Soci	medical	absent	absent	absent	present
25	Lega Italiana contro l'Epi	medical	absent	absent	absent	absent
26	Societa' Italiana dell'Iper	medical	absent	absent	absent	present
27	Societa' Italiana dell'Oste	medical	absent	absent	absent	present
28	Societa' Italiana di Allerg	medical	absent	absent	absent	missing
29	Societa' Italiana di Analis	medical	absent	present	absent	present
30	Societa' Italiana di Andro	medical	absent	absent	absent	present
31	Societa' Italiana di Cardi	medical	absent	present	absent	present
32	Societa' Italiana di Chem	medical	absent	absent	absent	present
33	Societa' Italiana di Derm	medical	absent	absent	absent	present
34	Societa' Italiana di Derm	medical	present	absent	absent	present
35	Societa' Italiana di Derm	medical	absent	absent	absent	missing
36	Societa' Italiana di Diabe	medical	absent	present	absent	present
37	Societa' Italiana di Ecogr	services	absent	absent	absent	absent
38	Societa' Italiana di Emaf	services	absent	absent	absent	absent
39	Societa' Italiana di Emat	medical	absent	present	absent	present
40	Societa' Italiana di Gastr	medical	absent	absent	absent	present
41	Societa' Italiana di Geria	medical	absent	absent	absent	present
42	Societa' Italiana di Geror	medical	absent	absent	absent	present
43	Societa' Italiana di Malatt	medical	absent	absent	absent	present
44	Societa' Italiana di Medic	medical	absent	present	absent	present
45	Societa' Italiana di Medic	medical	present	present	absent	present
46	Societa' Italiana di Medic	medical	absent	absent	present	absent
47	Societa' Italiana di Nefrol	medical	absent	absent	absent	present
48	Societa' Italiana di Neona	medical	absent	absent	absent	present
49	Societa' Italiana di Neuro	medical	absent	absent	absent	present
50	Societa' Italiana di Omec	medical	absent	absent	absent	missing
51	Societa' Italiana di Pedia	medical	absent	present	absent	present

53	Societa' Italiana di Reum	medical	absent	absent	absent	absent
54	Societa' Italiana per la Pr	medical	absent	absent	absent	absent
55	Societa' Italiana per le M	medical	absent	absent	absent	absent
56	Societa' Italiana per lo St	medical	absent	absent	absent	absent
57	Societa' Italiana per lo St	medical	absent	present	absent	present
58	Societa' Italiana Talassei	medical	absent	absent	absent	present
60	Societa' Italiana di Endos	medical	absent	present	absent	absent
61	Accademia Italiana di St	surgical	absent	absent	absent	present
62	Associazione Chirurghi C	surgical	present	absent	absent	present
63	Associazione Italiana di (	surgical	absent	absent	absent	present
64	Associazione Ostetrici G	surgical	absent	absent	absent	present
65	Associazione Urologi Ital	surgical	absent	absent	absent	present
66	Cenacolo Odontostomat	surgical	absent	present	absent	present
67	Ortopedici Traumatologic	surgical	absent	absent	absent	present
68	Societa' di Endoscopia G	surgical	absent	present	absent	missing
69	Societa' Italiana di Angio	surgical	absent	present	absent	missing
70	Societa' Italiana di Chirur	surgical	absent	absent	absent	present
71	Societa' Italiana di Chirur	surgical	absent	absent	present	absent
72	Societa' Italiana di Chirur	surgical	absent	present	absent	present
73	Societa' Italiana di Chirur	surgical	present	present	absent	present
74	Societa' Italiana di Chirur	surgical	absent	absent	absent	present
75	Societa' Italiana di Chirur	surgical	absent	absent	absent	missing
76	Societa' Italiana di Chirur	surgical	absent	present	absent	absent
77	Societa' Italiana di Diagn	surgical	missing	absent	absent	absent
78	Societa' Italiana di Ecogr	surgical	absent	absent	absent	absent
79	Societa' Italiana di Endos	surgical	absent	present	absent	absent
80	Societa' Italiana di Flebol	surgical	absent	present	absent	present
81	Societa' Italiana di Ginec	surgical	absent	present	absent	present
82	Societa' Italiana di Neurc	surgical	absent	absent	present	present
83	Societa' Italiana di Oftaln	surgical	absent	present	absent	absent
84	Societa' Italiana di Ortop	surgical	present	absent	absent	present
85	Societa' Italiana di Otorin	surgical	absent	present	absent	missing
86	Societa' Italiana di Urodi	surgical	absent	absent	absent	present
87	Societa' Italiana di Urolo	surgical	absent	present	absent	present
88	Societa' Oftalmologica It	surgical	absent	absent	present	present
89	Associazione Scientifica	medical	absent	absent	absent	absent
90	Societa' Nazionale di Ag	medical	absent	absent	absent	present
91	Associazione Italiana di I	services	absent	present	absent	absent
92	Associazione Italiana di I	services	absent	present	absent	present
93	Associazione Italiana di I	services	absent	absent	absent	present
94	Associazione Italiana di I	services	absent	absent	absent	present
95	Associazione Italiana di I	services	absent	absent	absent	absent
96	Associazione Italiana di I	services	absent	present	absent	present
97	Associazione Italiana Dis	services	absent	present	absent	present
98	Associazione Italiana Do	services	absent	absent	absent	present
99	Associazione Medica Ital	services	absent	absent	absent	present
100	Associazione Medico-Gi	services	absent	present	absent	present
101	Associazione Microbiolo	services	absent	absent	absent	present
102	Associazione Nazionale	services	absent	absent	absent	missing
103	Associazione Nazionale	services	absent	absent	absent	absent
104	Associazione Nazionale	services	absent	absent	absent	absent
105	Centro Italiano di Sessuc	services	absent	absent	absent	absent

106	Federazione delle Assoc	services	absent	present	absent	present
107	Federazione Italiana dell	services	absent	absent	absent	absent
108	Fondazione GIMBEwww	services	absent	absent	absent	absent
109	Societa' Italiana Anestes	services	absent	absent	absent	absent
110	Societa' Italiana di Agopı	services	absent	absent	absent	absent
111	Societa' Italiana di Anest	services	absent	absent	absent	present
112	Societa' italiana Audiolog	services	absent	present	absent	present
113	Societa' Italiana di Biochi	services	absent	absent	absent	present
114	Societa' italiana di citolog	services	absent	absent	absent	absent
115	Societa' Italiana di Cure I	services	absent	absent	absent	present
116	Societa' Italiana di Diagn	surgical	absent	present	absent	present
117	Societa' Italiana di Farma	services	absent	absent	present	present
118	Societa' Italiana di Igiene	services	absent	absent	absent	absent
119	Societa' Italiana di Medic	surgical	absent	absent	absent	present
120	Societa' Italiana di Medic	medical	absent	absent	absent	absent
121	Societa' Italiana di Medic	services	absent	absent	present	absent
122	Societa' Italiana di Medic	services	absent	absent	absent	present
123	Societa' Italiana di Medic	services	absent	present	absent	present
124	Societa' Italiana di Medic	services	absent	absent	absent	present
125	Societa' Italiana di Nutriz	services	absent	absent	absent	present
126	Societa' Italiana di Radio	services	present	present	absent	present
127	Societa' Italiana di Riabili	services	absent	absent	absent	present
128	Societa' Italiana di Tossi	services	absent	absent	absent	absent
129	Societa' Italiana di Virolo	services	absent	absent	absent	present
130	Societa' Italiana Multidisc	services	absent	absent	absent	present
131	Societa' Italiana Sistemi	services	absent	absent	absent	present
132	Societa' Scientifica Italiar	services	absent	present	absent	absent
133	Societa' Scienze Farmac	services	absent	absent	absent	absent

Year last a	Industry sponso	Statute mentionin	Industry sponsorship in the program of the last annual conference
2013	assente	absent	present
2014	assente	missing	present
2014	presente	present	present
2013	presente	present	present
missing	missing	absent	missing
missing	missing	missing	missing
2013	assente	present	present
missing	missing	missing	missing
2013	presente	present	present
2013	assente	present	present
2013	presente	present	present
2013	presente	absent	present
2013	presente	absent	present
2014	presente	present	present
2012	presente	absent	present
missing	missing	present	missing
missing	missing	present	missing
2013	presente	absent	present
2014	presente	absent	present
missing	assente	absent	present
missing	missing	absent	missing
2013	presente	absent	present
2013	presente	absent	present
2013	presente	present	present
2014	assente	present	absent
2013	presente	present	present
2013	presente	present	present
missing	missing	absent	missing
2013	assente	absent	present
2014	presente	present	present
2013	presente	present	present
2014	assente	absent	present
2013	assente	absent	present
2014	presente	absent	present
missing	missing	absent	missing
2014	presente	present	present
2013	presente	present	present
2013	assente	absent	absent
2013	presente	present	present
2014	assente	absent	present
2014	presente	present	present
2013	assente	present	present
2012	assente	missing	present
2013	presente	present	present
2012	assente	present	present
2014	assente	absent	absent
2013	assente	present	present
2013	assente	present	present
2013	assente	absent	present
missing	assente	absent	missing
2014	assente	present	present

2014	assente	present	absent
2014	assente	present	absent
2014	assente	present	absent
2014	presente	present	present
2013	assente	present	present
2013	assente	absent	present
2014	assente	absent	absent
2014	assente	present	present
2013	presente	absent	present
2014	presente	present	present
2014	assente	absent	present
2014	presente	absent	present
2014	assente	present	present
2014	assente	present	present
2013	assente	missing	missing
missing	assente	absent	missing
2013	assente	absent	present
2013	assente	present	absent
2014	assente	absent	present
2014	assente	absent	present
2014	assente	present	present
2013	assente	absent	missing
2014	assente	present	absent
2013	assente	absent	absent
2014	assente	absent	absent
2014	assente	absent	absent
2014	assente	missing	present
2014	presente	absent	present
2014	assente	present	present
2014	assente	absent	absent
2014	assente	absent	present
2014	assente	present	missing
2014	presente	present	present
2013	assente	absent	present
2013	presente	present	present
2013	assente	present	absent
2013	assente	present	present
2012	assente	absent	absent
2013	presente	present	present
2013	presente	present	present
2013	presente	absent	present
2013	assente	absent	absent
2013	presente	present	present
2013	assente	missing	present
2014	assente	present	present
2012	assente	missing	present
2013	assente	missing	present
2013	presente	absent	present
missing	missing	missing	missing
2013	assente	absent	absent
2013	assente	absent	absent
2010	assente	present	absent

2013	presente	absent	present
2013	assente	missing	absent
2014	assente	absent	absent
2012	assente	absent	absent
2013	assente	absent	absent
2013	presente	present	present
2013	presente	present	present
2013	presente	present	present
2011	assente	present	absent
2013	presente	absent	present
2011	assente	present	present
2013	presente	present	present
2013	presente	present	present
2013	presente	missing	present
2013	assente	present	absent
2013	assente	absent	absent
2013	presente	present	present
2013	assente	absent	present
2013	presente	present	present
2013	presente	absent	present
2012	presente	present	present
2013	assente	present	present
2012	assente	absent	absent
2012	assente	absent	present
2012	assente	absent	present
2013	assente	absent	present
2013	assente	missing	absent
2014	assente	absent	absent

either/or of satellite symposia

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Conflict of interest between Professional Medical Societies and industry: a cross-sectional study of Italian Medical Societies' websites

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ABSTRACT

Objective To describe how Italian medical societies interact with pharmaceutical and medical device industries through an analysis of the information available on their websites.

Design Cross sectional study.

Setting Italy.

Participants One hundred and fifty-four medical societies registered with the Italian Federation of Medical-Scientific Societies.

Main outcome measures Indicators of industry sponsorship (presence of industry sponsorship in the program of the last medical societies' annual conference; presence of manufacturers' logos on the homepage; presence of industry sponsorship of satellite symposia during the last annual conference).

Results One hundred and thirty-one Italian medical societies were considered. Of these, 4.6% had an ethical code covering relationships with industry on their websites, while 45.6% had a statute that mentioned the issue of conflict of interest, and 6.1% published the annual financial report. With regard to industry sponsorship, 64.9% received private sponsorship for their last conference, 29.0% had manufacturers' logos on their webpage, while 35.9% had industry-sponsored satellite symposia at their last conference. The presence of an ethical code on the societies' websites was associated with both an increased risk of industry sponsorship of the last conference (RR 1.22, 95% CIs 1.01 to 1.48 after adjustment) and of conferences either/or satellite symposia (RR 1.22, 95% CIs 1.02 to 1.48 after adjustment) but not with the presence of manufacturers' logos on the websites (RR 1.79, 95% CIs 0.66 to 4.82 after adjustment). No association was observed with the other indicators of governance and transparency.

Conclusions This survey shows that industry sponsorship of Italian medical societies' conferences is common, while the presence of a structured regulatory system is not. Disclosure of the amount of industry funding to medical societies is scarce. The level of transparency therefore needs to be improved and the whole relationship between medical societies and industry should be further disciplined in order to avoid any potential for conflict of interest.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- To our knowledge, this is one of the first assessments of the relationship between Italian medical societies and pharmaceutical and medical device industries.
- A systematic approach was used to explore the medical societies' websites; data on societies' policies on governance and transparency were independently collected by two coders.
- With regard to the limitations, we relied only on information disclosed in the medical societies' websites without any further Internet searches, nor we performed a quality assessment of websites.
- The study has an Italian focus and we acknowledge that an international comparison would have been fundamental in order to ensure generalizability to our findings.

INTRODUCTION

Professional Medical Societies play an important role in advancing the quality of medical care through the development of clinical practice guidelines that shape clinical practice, dissemination of information through the publication or sponsorship of a journal, funding of research projects and the organization of educational conferences and continuing medical education (CME) events.[1,2] Moreover, medical societies advocate for the interest of their practitioners as the *"voice of the profession"*.[3]

Both pharmaceutical and medical device industries extensively fund several activities carried out by medical societies.[1,2] Industries especially subsidize annual meetings and CME events, purchasing advertising spaces, funding physicians' attendance to these courses and sometimes, as the Institute of Medicine (IOM) points out, influencing the *"choice of topics and content*".[4]

During the past decades, an extensive literature has investigated the relationship between physicians and both pharmaceutical and medical device industries and has shown that some kinds of interaction could unduly influence professional judgments leading to the potential for bias and conflict of interest (COI).[4,5] A growing body of literature has also investigated the issue of conflict of interest applied to medical societies rather than to individual physicians and some researchers have made important recommendations for change.[1-3,6-8] Particularly, strong recommendations have been made with regard to industry sponsorship of congresses due to the possibility for the sponsor to bias the educational content of the event thus influencing doctors' prescribing habits.[1] Changes have been proposed also for the organisation of satellite symposia: current recommendations suggest to clearly mark them as industry sponsored sessions and keep them separated both in space and time from the main event they parallel.[1] Following these recommendations, several medical societies have adopted specific institutional policies

governing their relationships with industry.[9-12] However, these are mainly US-based articles and case studies while little is known about the relationships between industry and medical societies in Europe, and particularly in Italy where this topic is still quite a grey area of research. To our knowledge, only one study recently published has investigated the level of transparency of Italian medical societies, focusing on obstetrical and gynaecological associations. Vercellini and colleagues found out that transparency regarding sponsorship and competing interests was almost non existent.[13]

The present study aims at describing how Italian medical societies interact with pharmaceutical and medical device industries through an analysis of the information available on their websites. In particular we aim to provide a description of the societies' policies on transparency and governance and of the extent of industry sponsorship on their activities. Furthermore, we explore possible associations between medical societies' policies on transparency and governance and their practices in terms of industry sponsorship of educational events.

METHODS

Study design and data collection

In order to explore the relationship between Italian medical societies and pharmaceutical and medical device industries, we carried out a cross-sectional study. We searched the websites of all medical societies registered with the Italian Federation of Medical-Scientific Societies (FISM) between January and September 2014. The Federation includes societies operating in the medical or scientific field that are involved in research or professional medical education activities and have been operating in Italy at the national level for at least 3 years.[14] It is also worth

mentioning that Italian medical societies are regulated by a Law Decree approved by the Ministry of Health in May 2004.[15] These are some of the criteria Italian medical societies need to meet in order to be officially recognised by the Ministry of Health:

- operating at the national level and physically present in at least 12 Italian regions;
- representing at least 30% of the health professionals working in that particular field;
- being a non-profit organisation;
- presence of a statute;
- organization of CME activities, collaboration with the Ministry of Health, funding of research projects, development of guidelines in collaboration with other institutions being listed among the main activities of the society.

From each medical societies website we collected the following information (yes/no questions):

- whether the medical societies' statute mentioned the issue of COI (by statute we meant the official document that contains the rules of conduct of the society, describes its organizational structure and states its purposes);
- the presence of an ethical code, defined as a document specifically developed to regulate medical societies' behavior in case of industry sponsorship;
- the publication of the annual financial report on the website;
- the presence of pharmaceutical or medical device companies' logos on the homepage;
- the presence of pharmaceutical or medical device industry sponsorship in the program of the last medical societies' annual conference;
- the presence of industry sponsorship of satellite symposia during the last annual conference.

With regard to the last two criteria, by last annual conference we meant an event that had been organized within the previous 12 months; this was also considered a proxy of how updated the websites were. In order to define industry sponsorship we looked at whether the manufacturers' names and/or logos were explicitly listed as "sponsors" in the program of the conference.

Data were independently extracted by five trained medical residents in Public Health and one trained Medical student, with duplicate independent coding of all data. A systematic approach was used to explore the websites and collect data on the medical societies' policies on governance and transparency. After the data collection, coders met to resolve disagreements and reach consensus. Statistical analyses were performed using the final information obtained after consensus. All analyses were performed using Stata 12.1 SE.

Statistical analyses

Our main purpose was to provide a detailed descriptive analysis of the relationship between Italian medical societies and the pharmaceutical and medical device industries. Categorical variables were described using frequency tables. Cross tabulations were performed for evaluating possible associations between industry sponsorship in the program of the last congress, industry sponsorship of satellite symposia and presence of manufacturers' logos on medical societies' websites using chi-square or Fisher exact test, as appropriate.

As a second step, we aimed to explore the relationship between medical societies' regulatory systems in terms of policies on governance and transparency (i.e. the presence of an ethical code, the presence of a statute covering relations with industry, the publication of the annual financial report on the website) and their actual behaviors. Our main outcome was the presence of pharmaceutical or medical device industry sponsorship in the program of the last annual

conference. Moreover, while recognizing that the conference sponsorship might be considered a stronger sign of corporate influence, satellite symposia - whether not sufficiently regulated as proposed by Rothman - might as well undermine the scientific integrity of the main meeting they parallel.[1] Therefore we performed sensitivity analyses evaluating the combined outcome of having industry sponsorship in the program of the last annual conference either/or of satellite symposia.

As a secondary outcome we explored the relationship between medical societies' regulatory systems and the presence of industry logos on medical societies' websites. Possible predictors were the presence of an ethical code, of a statute regulating COI and the publication of the annual financial report on the website.

Medical societies were divided into three main categories (surgical – those for which the main activity is a surgical intervention on the patient, i.e. cardio-surgery; clinical – those for which the main activity is to provide non-surgical treatment to the patients, i.e. cardiology; services – those for which the main activity is to support/make possible the activities of the previous areas, i.e. radiology, hygiene and public health, forensic medicine), according to the official definition provided by the Italian Ministry of Education, Universities and Research [16], which was used as adjustment variable (categorical) together with the societies' dimension (continuous). We performed stratified analyses within each specialty in order to identify possible differences between the three groups. Our hypothesis was that pharmaceutical and medical device industries would target their marketing activities to certain medical specialties more than others, for example the societies belonging to the clinical and surgical specialties - where doctors have more prescribing power - might have more financial ties with manufacturers compared to the service category.

Because of the high prevalence of industry sponsorship in the program of the last annual conference, we used Poisson regression to estimate relative risks.[17] Results are presented as RR with 95% CI.

RESULTS

A detailed description of the medical societies included in the survey can be found in Table 1.

Table 1. Description of Professional Medical Societies included in the survey

	All sample (n=131)	*Only services (n=42)*	*Only medical (n=59)*	*Only surgical (n=30)*
	N (%)	**N (%)**	**N (%)**	**N (%)**
Transparency and governance				
Ethical code covering relations with industry	6 (4.6)	1 (2.4)	2 (3.4)	3 (10.0)
Statute covering relations with industry	60 (45.8)	16 (38.1)	32 (54.2)	12 (40.0)
Annual financial report on website	8 (6.1)	2 (4.8)	3 (5.1)	3 (10.0)
Industry sponsorship				
Manufacturers' logos on the	38 (29.0)	10 (23.8)	15 (25.4)	13 (43.3)

website				
Industry sponsorship in the program of the last annual conference	85 (64.9)	24 (57.1)	41 (69.5)	20 (66.7)
Industry sponsorship of satellite symposia	47 (35.9)	17 (40.5)	23 (39.0)	7 (23.3)
Industry sponsorship in the program of the last annual conference OR satellite symposia	88 (67.2)	26 (61.9)	42 (71.2)	20 (66.7)
Dimension				
<500 affiliates	55 (42.0)	19 (45.2)	18 (30.5)	18 (60.0)
501-1000 affiliates	20 (15.3)	6 (14.3)	13 (22.0)	1 (3.3)
1001-2000 affiliates	19 (14.5)	7 (16.7)	12 (20.3)	0 (0.0)
2001-4000 affiliates	11 (8.4)	4 (9.5)	2 (3.4)	5 (16.7)
>4000 affiliates	8 (13.7)	1 (2.4)	4 (6.7)	3 (10.0)

Type of societies

In 2013, 154 Medical Societies were registered with FISM, 23 of which were excluded from our analysis because information on the outcome was not available (i.e. the website was not accessible or it was not possible to retrieve a detailed program of the last annual conference). No differences were observed between the included and the excluded societies (p=0.565 for the type of society, p=1.000 for the presence of an ethical code, p=0.600 for the presence of the annual financial report on their website, p=0.334 for the presence of manufacturers' logos on their website, p=0.251 for the society dimension. Because of the absence of the program of the last annual conference, neither this outcome nor the presence of industry-sponsored satellite symposia could be tested). With regard to the 131 medical societies included in our study, 42 (32.1%) were from the services, 59 (45.0%) from the clinical and 30 (22.9%) from the surgical area. A detailed description of the medical specialties represented in each group is provided in Supplementary File 2. With regard to the dimension, 57.3% of the societies had less than 1000 affiliates.

Transparency and governance

Only 4.6% of the medical societies had an ethical code covering relations with industry on their websites, while less than half (45.6%) of the statutes mentioned the issue of COI, and only 6.1% published the annual financial report.

Industry sponsorship

Almost one third (29.0%) of medical societies had manufacturers' logos on their webpage, with the highest frequency registered in the surgical category (43.3%). Two thirds (67.7%) of medical

societies had either their last conference or satellite symposia sponsored by industry; in particular 64.9% of these had industry sponsorship of their last conference, while 35.9% had industry-sponsored satellite symposia at their last conference. Satellite symposia were always organized within the conference, and were held either in series or parallel to the main session. This means there was no clear separation in time, as mentioned by Rothman.[1] As for the separation in space, in most cases it was impossible to retrieve this information from the conference program, since locations were not always listed.

We observed an association between having industry sponsorship of the last conference and of satellite symposia (chi-square test: $p<0.0001$), but not between having a private sponsorship of the last conference and the presence of manufacturers' logos on the websites ($p=0.132$).

Relationship between medical societies' policies and funding of annual meetings

Table 2 summarizes the findings of an exploratory analysis on the association between medical societies' policies on transparency and governance and the industry sponsorship of their last annual conference.

Table 2. Relative risks of having pharmaceutical or medical device industry sponsorship in the program of the last medical societies' annual conference

	Main model		*Stratified analysis*					
	All sample (n=131)		*Only services (n=42)*		*Only clinical (n=59)*		*Only surgical (n=30)*	
	crude RR	*adjusted RR*	*crude RR*	*adjusted RR*	*crude RR*	*adjusted RR*	*crude RR*	*adjusted RR*
Ethical code	1.39 (1.23-1.57)	**1.22 (1.01-1.48)**	1.74 (1.33-2.28)	0.66 (0.42-1.04)	1.23 (1.07-1.41)	**1.28 (1.04-1.59)**	1.29 (1.03-1.63)	1.33 (0.88-2.01)
Statute	1.16 (0.91-1.47)	1.17 (0.89-1.53)	1.67 (0.94-2.94)	1.48 (0.81-2.70)	0.86 (0.67-1.12)	0.86 (0.59-1.23)	1.18 (0.74-1.89)	1.28 (0.74-2.19)
No annual financial report on website	1.29 (0.67-2.48)	1.22 (0.72-2.08)	1.28 (0.31-.32)	1.80 (0.65-4.94)	1.71 (0.42-6.96)	1.65 (0.33-8.19)	1.17 (0.50-2.73)	0.95 (0.67-1.32)
Dimension of society	1.14 (1.06-1.22)	**1.13 (1.05-1.21)**	1.29 (1.09-1.53)	**1.28 (1.02-1.61)**	1.09 (0-98-1.21)	1.11 (0.01-6.03)	1.08 (0.99-1.18)	1.08 (0.25-1.67)
Type of society								
Services	1	1	-	-	-	-	-	-

Clinical	1.40 (1.05-1.87)	1.22 (0.89-1.78)	-	-	-	-	-	-
Surgical	1.31 (0.94-1.84)	1.32 (0.94-1.84)	-	-	-	-	-	-

Within the whole sample, interestingly the presence of an ethical code on the societies' websites was associated with an increased risk of industry sponsorship of the last conference (crude RR 1.39, 95% CIs 1.23 to 1.57; RR 1.22, 95% CIs 1.01 to 1.48 after adjustment). The presence of a statute covering relations with industry showed no association with the risk of having the last conference sponsored by industry when looking at both the crude (RR 1.16, 95%CIs 0.91 to 1.47) and the adjusted RR (1.17, 95% CIs 0.89 to 1.53). The absence of the annual financial report on the website did not show any association with industry sponsorship of the last conference either (crude RR 1.29, 95%CIs 0.67 to 2.48; adjusted RR 1.22, 95% CIs 0.72 to 2.08). Interestingly the society dimension was associated with an increased risk of industry sponsorship of the last conference (crude RR 1.14, 95% CIs 1.06 to 1.22; RR 1.13, 95% CIs 1.05 to 1.21 after adjustment), while no association was observed with the type of society.

Finally, we observed no specific pattern between the presence of a statute covering relations with industry, the presence of an ethical code, or financial transparency, and the risk of industry sponsorship within each type of society, despite finding an increased risk of industry sponsorship

associated with the presence of an ethical code within the clinical group.

When we repeated the analysis using the composite outcome "private sponsorship of the last conference or satellite symposia", no major differences were observed (Supplementary File 1).

Relationship between medical societies' policies and presence of manufacturers' logos on the website

Table 3 shows the results of an exploratory analysis on the association between medical societies' policies on transparency and governance and the presence of manufacturers' logos on their websites. No association with presence of manufacturers' logos was observed either in presence of an ethical code or of a statute covering relations with industry.

Table 3. Relative risks of having manufacturers' logos on medical societies' websites.

	Main model		***Stratified analysis***					
	All sample (n=131)		***Only services (n=42)***		***Only clinical (n=59)***		***Only surgical (n=30)***	
	crude RR	***adjusted RR***	***crude RR***	***adjusted RR***	***crude RR***	***adjusted RR***	***crude RR***	***adjusted RR***
Ethical code	1.79 (0.76-4.21)	1.79 (0.66-4.82)	2.27 (0.49-9.93)	10.52 (0.53-206.83)	2.11 (0.48-9.27)	2.72 (0.61-12.19)	0.72 (0.13-3.88)	0.92 (0.27-3.14)
Statute	0.97 (0.53-1.75)	1.21 (0.62-2.35)	1.67 (0.42-6.52)	1.64 (0.31-8.59)	0.96 (0.38-2.41)	1.16 (0.33-4.07)	0.71 (0.27-1.91)	0.84 (0.33-2.12)

No annual financial report on website	NC	NC	NC	NC	NC	NC	NC	NC
Dimension of society	0.96 (0.77-1.19)	0.92 (0.72-1.19)	1.03 (0.69-1.55)	0.74 (0.28-1.96)	1.19 (0.83-1.69)	1.27 (0.84-1.91)	0.78 (0.56-1.09)	0.74 (0.27-3.13)
Type of society								
Services	1	1	-	-	-	-	-	-
Clinical	1.09 (1.54-2.18)	1.97 (0.41-2.32)	-	-	-	-	-	-
Surgical	1.82 (0.92-3.60)	1.99 (0.89-4.43)	-	-	-	-	-	-

NC: non calculable because of 0 count cells: no societies with an available annual financial report showed a logo on their website.

DISCUSSION

To our knowledge, this is one of the first assessments of the relationship between Italian medical societies and pharmaceutical and medical device industries. We provided an overview of the type of industry support and of the policies implemented by medical societies in order to face the issue of COI, showing how common is the industry sponsorship of medical events and how uncommon is the presence of a structured regulatory system.

Transparency

According to the data presented in Table 1, there seems to be a general lack of transparency: only 6.1% of all the societies included in our study shared information on their financing. Since medical societies are not required to disclose this information, the amount of industry funding is often unknown. Full disclosure and complete transparency in the relationship between industry and medical societies is a fundamental step for the credibility of both of them and the USA Physician Payments Sunshine Act sets an interesting precedent.[18] Italy does not currently have transparency laws that are similar to the Sunshine Act. However, it is worth noticing that the European Federation of Pharmaceutical Industries and Associations (EFPIA), the representative body of the pharmaceutical industry in Europe, adopted a "Disclosure Code" in 2013.[19] According to the Code, starting from 2016 EFPIA member companies will make public details of certain payments made to healthcare professionals and healthcare organisations. While supporters of industry self-regulation welcome this effort, some authors point out that self-regulatory transparency measures might be a tactic the pharmaceutical industry is pursuing to prevent government-imposed transparency.[20] We therefore urge Italian governmental agencies

to require a public disclosure of manufacturers' funding to physicians, medical societies and health care providers and strictly monitor the completeness, accuracy and accessibility of the information provided.

However, even if transparency is the main strategy internationally adopted to face the issue of COI, it seems to have some limits. According to our data, even when medical societies are more transparent this doesn't seem to be associated with a decreased level of industry sponsorship of their conferences (see the following paragraph for further discussion on the relationship between policies and practices). This leads to a reflection on the limits of the strategies to address COI that focus merely on transparency. Even if the disclosure makes others aware of the presence of a COI, it doesn't seem to be a sufficient protection and according to some authors, it might also have *"significant adverse effects"* through several mechanisms such as creating the wrong feeling that once the COI is declared, there is no need to manage it.[12,21] As Loewenstein points out, the issue to be considered "*should not be whether to disclose but how to ensure that disclosure has its intended effects*".[21]

Relationship between policies and practices

We conducted an exploratory analysis on the association between medical societies' policies and their consequent behaviors in terms of industry sponsorship in the program of the last annual conference and presence of manufacturers' logos on their websites. We found that the presence of an ethical code on the societies' websites is associated with both an increased risk of industry sponsorship of the last conference and of conferences either/or satellite symposia but not with the presence of manufacturers' logos on the websites. No association was observed with the other indicators of governance and transparency.

There could be two different interpretations of these data and due to the cross-sectional nature of our study that is not meant to establish causal relationships, none of them can be excluded.

On one hand, it seems that the societies with higher level of industry sponsorship of their conferences are more likely to have ethical codes, and this might be expected because having these relationships with manufacturers, they could feel a need to govern them. Therefore, the regulation might be a consequence of their relationship with industry. However, another possible explanation might be that the societies with an ethical code tend to be more transparent, and thus are more likely to disclose industry sponsorship when it actually occurs.

Whatever the direction, it seems that the presence of a regulation or ethical code does not decrease the level of industry sponsorship. There could be different explanations for this phenomenon: firstly, codes and regulations may not be stringent or effective enough to prevent - or at least manage - the COI. Secondly, there may be a lack of monitoring and vigilant enforcement of these guidelines once they are developed. It is also worth pointing out that we evaluated whether medical societies mentioned the issue of COI but did not analyse how they conceived it, therefore there might be different definitions of conflict of interest in their ethical codes or statutes. However, although it was not an objective of this study, it is worth emphasizing that in reviewing medical societies' statutes and ethical codes we generally found no clear definitions of COI and except for a few cases with very detailed regulation, there was usually a quite general reference to the issue.

Looking at the actual behavior of medical societies, namely how common is the industry sponsorship of their conferences, it is worth questioning whether there is any perception that industry sponsorship of an educational event itself creates a conflict of interest. As several authors state, COI is a condition and not necessarily a behavior and the bias created by COI is

often very subtle, unconscious and unintentional.[22] A growing amount of literature has also shown that industry-sponsored educational events are biased toward the product of the sponsor and might influence physicians' prescribing habits.[23,24]. Looking at how common is the industry sponsorship of medical events in our sample, it does not seem that this is perceived as a conflict of interest situation that might undermine the integrity and independence of medical societies.

Finally, our initial hypothesis that societies in the services field might be less prone to industry-sponsorship was not confirmed. According to our data, the number of society members is a more important determinant of industry sponsorship of medical events, as might be expected because it provides a larger target audience.

What can be done

Public disclosure of financial relationships between physicians, medical societies, health care providers and manufacturers is of course a needed step and we call upon our Government to make it a mandatory requirement. However, in order to face such a problem we need to be bold enough to rethink the whole relationship between physicians, medical societies and industry.

Several proposals and recommendations have already been made, from total ban on manufacturers' funding, to thresholds for the level of industry sponsorship that can be considered acceptable, to pooled funds administered through a central repository.[1,12] With regard to educational events, committees in charge of program content should be completely free of financial ties to industry, no manufacturers' logos should appear on the conference materials, and conference organizers should clearly label any industry-sponsored symposia.[1]

We recognize that all these proposals - both the softer and the more stringent ones - will require a huge cultural change but it is time to start demythologizing some of the most accepted paradigms like the idea that it is not possible to organize medical education events without any industrial sponsorship.[25] There are already examples of medical societies who have made interesting and bold attempts both at the national and at the international level.[9,10,12] With regard to Italy, it is worth highlighting that the Pediatricians' Cultural Association (Associazione Culturale Pediatri, ACP), the Italian Society of Migration Medicine (Società Italiana Medicina delle Migrazioni, SIMM) and the Italian Secretariat of Medical Students (Segretariato Italiano Studenti di Medicina, SISM), the biggest association of Medical students in Italy, have adopted stringent ethical codes on COI and have been organizing their annual conferences without industry-sponsorship.[26-28] These few but extremely positive examples could provide a template for other medical societies to transform their mode of operation and to "*reduce commercialism and restore professionalism to our medical meetings"*.[8]

Limitations

Our study has a number of limitations. First of all, this is a cross-sectional study, and as so it is not intended for establishing causal relationships. We can only describe the associations we observed but we cannot exclude they are spurious, nor we can state whether industry sponsorship is the result of the absence of an ethical code regulating COI or vice versa. Moreover, we decided to rely only on information disclosed in the medical societies' websites without any further Internet searches, nor we performed a quality assessment of websites. It is possible that those who designed a low quality or not well structured website were more likely to underestimate the importance of publishing an ethical code or a statute, but actually had one,

rather than those who set up a well structured or better updated website. Therefore we cannot exclude a certain amount of imprecision in our results. Moreover, we didn't quantify the proportion of funding given by industry on the total amount of funds, which could be an important indicator of their independence from the sponsor. Also, in order to group the medical societies, we used the categorization provided by the Italian Ministry of Education, Universities and Research. As previously mentioned, our hypothesis was that the influence of pharmaceutical and medical device industries may be stronger on those societies where the prescribing power of doctors is higher (i.e. clinical and surgical specialties). However, this was not confirmed.

Finally, the results of our exploratory analyses (Tables 2, 3 and Supplementary File 1) are somewhere heterogeneous. It seems like the presence of regulations (e.g. the ethical code) has a certain association with industry sponsorship of annual conferences (Table 2) and with the organization of industry-funded conferences either/or satellite symposia (Supplementary File 1), but not with the presence of manufacturers' logos on societies websites (Table 3). It might be that showing manufacturers' logos is not perceived as a possible source of COI, and is therefore not regulated, or conversely since it is not regulated, there is no perceived need to eliminate the logos from the websites. We think this point requires further investigation in order to examine the kinds of financial relationships that may be hidden behind the presence of manufacturers' logos on medical societies' websites.

With regard to the generalizability, our study focused on Italian medical societies, and particularly only on those affiliated to the Italian Federation of Medical-Scientific Societies. It is possible that these societies are more virtuous than those not affiliated to the Federation, or the other way round, therefore we cannot conclude that this situation is common to all Italian medical societies. However, Italian medical societies voluntarily decide to become members of

the Federation, therefore we are quite confident of our results. Despite these limitations, and considering the data from previous studies [1,2], we believe that our results may be relevant also to other countries.

CONCLUSIONS

The interaction between medical societies and industry has come under increasing scrutiny over the last decades. While recognizing the importance of appropriate forms of collaboration between physicians and pharmaceutical industries, we strongly believe that, as Schofferman states, the potential values of these collaborations do not mitigate their potential risks: these relationships *"are conflicted by their very nature and have the potential to create unconscious bias that might influence patient care"*.[12]

We hope our analysis of the current Italian medical societies' relationship with industry might be a first step in order to stimulate a reflection on this controversial issue in our country. In this perspective, we aim to use this survey as an advocacy tool for a debate that we, as residents and doctors in training, would like to launch among our medical societies.

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CONTRIBUTORS

AF, DT, FN, AL, FG, AR conceived the study. AR designed the data collection tool and coordinated the data collection. FF, FG, DI, CL, ES, AR collected the data. GG, AR, AF planned the statistical analysis and GG analysed the data. AF, GG, AR wrote the first draft of the paper. DT, FN, AL contributed to the writing of the paper. All authors critically revised the manuscript and approved the final version. AF is guarantor.

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COMPETING INTERESTS

All authors have completed the ICMJE disclosure form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years. DT, FF, DI, AR, GG, FG, ES are members of the Italian Society of Hygiene, Preventive Medicine and Public Health (S.It.I.). S.It.I is one of the medical societies that were evaluated in our research.

ETHICAL APPROVAL

Not required.

DATA SHARING

There are no data in addition to those presented in this report. The dataset is available upon request from the corresponding author.

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Supplementary File 1. Relative risks of having pharmaceutical or medical device industry sponsorship in the program of the last medical societies' annual conference or satellite symposia

	Main model		*Stratified analysis*					
	All sample (n=131)		*Only services (n=42)*		*Only clinical (n=59)*		*Only surgical (n=30)*	
	crude RR	*adjusted RR*	*crude RR*	*adjusted RR*	*crude RR*	*adjusted RR*	*crude RR*	*adjusted RR*
Ethical code	1.34 (1.20-1.50)	**1.22 (1.02-1.48)**	1.60 (1.25-2.04)	0.63 (0.41-1.00)	1.20 (1.06-1.36)	**1.24 (1.03-1.49)**	1.29 (1.03-1.63)	1.33 (0.88-2.01)
Statute	1.24 (0.98-1.56)	1.23 (0.95-1.60)	1.94 (1.15-3.29)	1.66 (0.94-2.91)	0.90 (0.70-1.15)	0.91 (0.65-1.27)	1.18 (0.74-1.89)	1.28 (0.75-2.19)
No annual financial report on website	1.34 (0.70-2.57)	1.25 (0.75-2.09)	1.28 (0.31-5.32)	1.86 (0.71-4.86)	1.71 (0.42-9.96)	1.68 (0.36-7.78)	1.17 (0.50-2.73)	0.94 (0.67-1.32)
Dimension of society	1.13 (1.06-1.20)	**1.11 (1.04-1.19)**	1.28 (1.09-1.50)	**1.25 (1.01-1.55)**	1.06 (0.96-1.17)	1.07 (0.96-5.52)	1.08 (0.99-1.18)	1.08 (0.99-1.17)
Type of society								
Services	1	1	-	-	-	-	-	-
Clinical	1.32	1.18	-	-	-	-	-	-

	(1.02-1.72)	(0.89-1.57)						
Surgical	1.21 (0.89-1.66)	1.26 (0.92-1.74)	-	-	-	-	-	-

Supplementary file 2. List of included and excluded medical societies and description of their specialties

Included societies	Specialty	Type of society
Academy of Emergency Medicine and Care (AcEMC) www.acemc.it	Emergency Medicine	Clinical
Associazione Dermatologi Ospedalieri Italiani (ADOI) www.adoi.it	Dermatology	Clinical
Associazione Italiana di Aritmologia e Cardiostimolazione (AIAC) www.aiac.it	Cardiology	Clinical
Associazione Italiana di Oncologia Medica (AIOM) www.aiom.it	Oncology	Clinical
Associazione Italiana di Oncologia Toracica (AIOT) www.oncologiatoracica.it	Oncology	Clinical
Associazione Italiana Gastroenterologi & Endoscopisti Digestivi Osp. (AIGO) www.webaigo.it	Gastroenterology	Clinical
Associazione Italiana Neuroimmunologia (AINI) www.aini.it	Neurology	Clinical
Associazione Italiana Per lo Studio del Fegato (AISF) www.webaisf.it	Gastroenterology	Clinical
Associazione Italiana per lo Studio delle Familiarità ed Ereditarietà dei tumori Gastrointestinali (AIFEG) www.aifeg.it	Oncology	Clinical
Associazione Italiana Pneumologi Ospedalieri (AIPO) www.aiponet.it	Pneumology	Clinical
Associazione Italiana Ulcere Cutanee (AIUC Onlus) www.aiuc.it	Internal Medicine	Clinical
Associazione Medici Diabetologi (AMD) www.aemmedi.it	Diabetology	Clinical
Associazione Medici Endocrinologi (AME) www.associazionemediciendocrinologi.it	Endocrinology	Clinical
Associazione Nazionale Medici Cardiologi Ospedalieri (ANMCO) www.anmco.it	Cardiology	Clinical
Associazione Neurologica Italiana per la Ricerca sulle Cefalee (ANIRCEF) www.anircef.it	Neurology	Clinical
Associazione Società Scientifica Interdisciplinare e di Medicina di Famiglia e Comunità (ASSIMEFAC) www.assimefac.it	General Practice	Clinical
Collegio Reumatologi Ospedalieri Italiani (CROI) www.croi.it	Rheumatology	Clinical
Federazione Centri per la Diagnosi della Trombosi e la Sorveglianza delle Terapie Antitrombotiche (FCSA) www.fcsa.it	Haematology	Clinical
Federazione Italiana Associazioni Medici Omeopati (FIAMO) www.fiamo.it	Omeopathy	Clinical
Federazione Italiana delle Società delle Malattie Apparato Digerente (FISMAD) www.fismad.it	Gastroenterology	Clinical
Federazione Italiana Medici Pediatri (FIMP) www.fimp.org	Paediatrics	Clinical
Gruppo Italiano per lo Studio Motilità Apparato Digerente (GISMAD) www.gismad.it	Gastroenterology	Clinical
Gruppo Oncologico dell'Italia Meridionale (GOIM) www.goim.it	Oncology	Clinical
International Italian Society of Plastic Regenerative and Oncologic Dermatology (ISPLAD) www.isplad.org	Plastic surgery	Clinical
Lega Italiana contro l'Epilessia (LICE) www.lice.it	Neurology	Clinical
Società Italiana dell'Ipertensione Arteriosa (SIIA) www.siia.it	Internal Medicine	Clinical
Società Italiana dell'Osteoporosi, Metabolismo Minerale e Malattie dello Scheletro (SIOMMMS) www.siommms.it	Internal Medicine	Clinical
Società Italiana di Allergologia ed Immunologia Clinica (SIAIC) www.siaic.net	Internal Medicine	Clinical
Società Italiana di Analisi del Movimento in Clinica (SIAMOC) www.siamoc.it	Physiatry	Clinical
Società Italiana di Andrologia (SIA) www.andrologiaitaliana.it	Andrology	Clinical
Società Italiana di Cardiologia (SIC) www.sicardiologia.it	Cardiology	Clinical
Società Italiana di Chemioterapiawww.chemio.org	Pharmacology	Clinical
Società Italiana di Dermatologia Allergologia Professionale e Ambientale (SIDAPA) www.sidapa.it	Dermatology	Clinical
Società Italiana di Dermatologia Medica, chirurgica, estetica e delle malattie sessualmente trasmesse (SIDeMaST) www.sidemast.org	Dermatology	Clinical
Società Italiana di Dermatologia Pediatrica (SIDerP) www.siderp.it	Dermatology	Clinical
Società Italiana di Diabetologia (SID) www.siditalia.it	Diabetology	Clinical
Società Italiana di Ematologia (SIE) www.siematologia.it	Haematology	Clinical
Società Italiana di Gastroenterologia (SIGE) www.sigeitalia.org	Gastroenterology	Clinical
Società Italiana di Geriatria Ospedale e Territorio (SIGOT) www.sigot.org	Geriatry	Clinical
Società Italiana di Gerontologia e Geriatria (SIGG) www.sigg.it	Geriatry	Clinical
Società Italiana di Malattie Infettive e Tropicali (SIMIT) www.simit.org	Infectivology	Clinical
Società Italiana di Medicina Interna (SIMI) www.simi.it	Internal Medicine	Clinical
Società Italiana di Medicina Respiratoria (SIMeR) www.simernet.eu	Pneumology	Clinical
Società Italiana di Medicina Trasfusionale e Immunoematologia (SIMTI) www.simti.it	Haematology	Clinical
Società Italiana di Nefrologia (SIN) www.sin-italy.org	Nefrology	Clinical
Società Italiana di Neonatologia (SIN) www.naonatologia.it	Paediatrics	Clinical
Società Italiana di Neuropsichiatria Infanzia e Adolescenza (SINPIA) www.sinpia.eu	Neuropsychiatry	Clinical
Società Italiana di Omeopatia e Medicina Integrata (SIOMI) www.siomi.it	Omeopathy	Clinical
Società Italiana di Pediatria (SIP) www.sip.it	Paediatrics	Clinical
Società Italiana di Reumatologia (SIR) www.reumatologia.it	Rheumatology	Clinical
Società Italiana per la Prevenzione Cardiovascolare (SIPREC) www.siprec.it	Cardiology	Clinical
Società Italiana per le Malattie Respiratorie Infantili (SIMRI) www.simri.it	Pneumology	Clinical
Società Italiana per lo Studio delle Cefalee (SISC) www.sisc.it	Neurology	Clinical
Società Italiana per lo Studio dell'Emostasi e Trombosi (SISET) www.siset.org	Haematology	Clinical
Società Italiana Talassemie ed Emoglobinopatie (SITE) www.site-italia.org	Haematology	Clinical
Società Italiana di Endoscopia Digestiva (SIED) www.sied.it	Gastroenterology	Clinical
Associazione Scientifica Promozione Aggiornamento Medico (ASPAM) www.aspam.org	Internal Medicine	Clinical
Società Nazionale di Aggiornamento per il Medico di Medicina Generale (SNAMID) www.snamid.org	General Practice	Clinical
Società Italiana di Medicina Antroposofica (SIMA) www.medicinaantroposofica.it	Others	Clinical
Società Italiana di Ecografia Cardiovascolare (SIEC) www.siec.it	Cardiology	Services
Società Italiana di Emaferesi e Manipolazione cellulare (SIdEM) www.emaferesi.it	Haematology	Services
Associazione Italiana di Dietetica e Nutrizione Clinica (ADI) www.aditalia.com	Nutrition	Services
Associazione Italiana di Fisica Medica (AIFM) www.fisicamedica.org	Medical Physics	Services
Associazione Italiana di Medicina Nucleare ed imaging molecolare (AIMN) www.aimn.it	Nuclear Medicine	Services
Associazione Italiana di Patologia Clinica e di Medicina Molecolare (AIPaC MeM) www.aipacmem.it	Pathology	Services
Associazione Italiana di Radioprotezione Medica (AIRM) www.airm.it	Occupational Medicine	Services
Associazione Italiana di Radioterapia Oncologica (AIRO) www.radioterapiaitalia.it	Radiology	Services
Associazione Italiana Disturbi dell'Alimentazione e del Peso (AIDAP)	Nutrition	Services
Associazione Italiana Donne Medico (AIDM) www.donnemedico.org	Others	Services
Associazione Medica Italiana di Omotossicologia (AIOT) www.medibio.it	Biological Medicine	Services
Associazione Medico-Giuridica Melchiorre Gioiawww.melchiorregioia.it	Forensic Medicine	Services
Associazione Microbiologi Clinici Italiani (AMCLI) www.amcli.it	Microbiology	Services
Associazione Nazionale Eco-Biopsicologia (ANEB) www.aneb.it	Medical Psychology	Services
Associazione Nazionale Medici d'Azienda e Competenti (ANMA) www.anma.it	Occupational Medicine	Services
Associazione Nazionale Specialisti Scienza dell'Alimentazione (ANSISA) www.ansisa.it	Nutrition	Services
Centro Italiano di Sessuologia (CIS) www.cisonline.net	Sexology	Services
Federazione delle Associazioni Dirigenti Ospedalieri Internisti (FADOI) www.fadoi.org	Hygiene and Preventive Medicine	Services
Federazione Italiana delle Società di Agopuntura (FISA) www.agopuntura-fisa.it	Acupuncture	Services
Fondazione GIMBEwww.gimbe.org	Hygiene and Preventive Medicine	Services
Società Italiana Anestesia Rianimazione Emergenza Dolore (SIARED) www.siared.it	Anesthesiology	Services
Società Italiana di Agopuntura (SIA) www.sia-mtc.it	Acupuncture	Services
Società Italiana di Anestesia, Analgesia, Rianimazione e Terapia Intensiva (SIAARTI) www.siaarti.it	Anesthesiology	Services
Società italiana Audiologia e foniatriawww.sia-f.it	Audiology	Services
Società Italiana di Biochimica Clinica e Biologia Molecolare Clinica (SIBioC) www.sibioc.it	Biological Medicine	Services
Società italiana di citologiawww.citologia.org	Pathology	Services
Società Italiana di Cure Palliative (SICP) www.sicp.it	Palliative Care	Services
Società Italiana di Farmacia Ospedaliera e dei Servizi Farmaceutici delle Aziende Sanitarie (SIFO) www.sifoweb.it	Pharmacology	Services
Società Italiana di Igiene, Medicina Preventiva e Sanità Pubblica (SItI) www.societaitalianaigiene.org	Hygiene and Preventive Medicine	Services
Società Italiana di Medicina del Lavoro e Igiene Industriale (SIMLII) www.simlii.it	Occupational Medicine	Services
Società Italiana di Medicina di Laboratorio (SIMEL) www.simel.it	Pathology	Services
Società Italiana di Medicina e Sanità Penitenziaria Onlus (SIMSPE) www.sanitapenitenziaria.org	Others	Services
Società Italiana di Medicina Fisica e Riabilitativa (SIMFER) www.simfer.it	Physiatry	Services
Società Italiana di Nutrizione Artificiale e Matabolismo (SINPE) www.sinpe.org	Nutrition	Services
Società Italiana di Radiologia Medica (SIRM) www.sirm.org	Radiology	Services
Società Italiana di Riabilitazione Neurologica (SIRN) www.sirn.net	Physiatry	Services
Società Italiana di Tossicologia (SITOX) www.sitox.org	Pharmacology	Services
Società Italiana di Virologia (SIV) www.siv-virologia.it	Microbiology	Services
Società Italiana Multidisciplinare per la Prevenzione delle Infezioni nelle Organizzazioni Sanitarie (SIMPIOS) www.simpios.it	Hygiene and Preventive Medicine	Services
Società Italiana Sistemi 118www.sis118.it	Hygiene and Preventive Medicine	Services
Società Scientifica Italiana Ossigeno-Ozono Terapia www.ossigenoozono.it	Others	Services
Società Scienze Farmacologiche Applicate (SSFA) www.ssfa.it	Pharmacology	Services
Accademia Italiana di Stomatologia Implantoprotesica (AISI) www.aisiitalia.com	Dentistry	Surgical
Associazione Chirurghi Ospedalieri Italiani (ACOI) www.acoi.it	Surgery	Surgical
Associazione Italiana di Chirurgia della Cataratta e Refrattiva (AICCER) www.aiccer.it	Ophthalmology	Surgical
Associazione Ostetrici Ginecologi Ospedalieri Italiani (AOGOI) www.aogoi.it	Gynecology	Surgical
Associazione Urologi Italiani (AURO) www.auro.it	Urology	Surgical
Cenacolo Odontostomatologico Italiano - Associazione It. di Odontoiatria Generale (COI-AIOG) www.cenacolo.com	Dentistry	Surgical
Ortopedici Traumatologici Ospedalieri d'Italia (OTODI) www.otodi.com	Orthopaedics	Surgical
Società di Endoscopia Ginecologica Italiana (SEGI) www.segionline.it	Gynecology	Surgical
Società Italiana di Angiologia e Patologia Vascolare (SIAPAV) www.siapav.it	Vascular surgery	Surgical
Società Italiana di Chirurgia (SIC) www.sichirurgia.org	Surgery	Surgical
Società Italiana di Chirurgia Cardiaca (SICCH) www.sicch.it	Cardiosurgery	Surgical
Società Italiana di Chirurgia Colorettale (SICCR) www.siccr.org	Surgery	Surgical
Società Italiana di Chirurgia della Mano (SICM) www.sicm.it	Orthopaedics	Surgical
Società Italiana di Chirurgia Maxillo Facciale (SICMF) www.sicmf.org	Maxillo-facial surgery	Surgical
Società Italiana di Chirurgia Plastica Ricostruttiva ed Estetica (SICPRE) www.sicpre.it	Plastic surgery	Surgical
Società Italiana di Chirurgia Vascolare ed Endovascolare (SICVE) www.sicve.it	Vascular surgery	Surgical
Società Italiana di Diagnosi Prenatale e Medicina Materno-Fetale (SIDIP) www.ilfeto.it	Gynecology	Surgical
Società Italiana di Ecografia Ostetrica Ginecologia e Metodologie biofisiche (SIEOG) www.sieog.it	Gynecology	Surgical
Società Italiana di Endoscopia - Area Chirurgicawww.isse.it	Surgery	Surgical
Società Italiana di Flebologia (SIF) www.societaitalianaflebologia.it	Vascular surgery	Surgical
Società Italiana di Ginecologia e Ostetricia (SIGO) www.sigo.it	Gynecology	Surgical
Società Italiana di Neurochirurgia (SINch) www.sinch.it	Neurosurgery	Surgical
Società Italiana di Oftalmologia Legale (SIOL) www.oftalmologialegale.it	Ophthalmology	Surgical
Società Italiana di Ortopedia e Traumatologia (SIOT) www.siot.it	Orthopaedics	Surgical
Società Italiana di Otorinolaringologia e Chirurgia Cervico-Facciale (SIOeCHCF) www.sioechcf.it	Ear, Nose and Throat	Surgical
Società Italiana di Urodinamica (SIUD) www.siud.it	Urology	Surgical
Società Italiana di Urologia Oncologica (SIUrO) www.siuro.it	Urology	Surgical
Società Oftalmologica Italiana (SOI) www.soiweb.com	Ophthalmology	Surgical
Società Italiana di Diagnostica Vascolare (SIDV-GIUV) www.sidv.net	Radiology	Surgical
Società Italiana di Medicina ad Indirizzo Estetico (AGORA) www.societamedicinaestetica.it	Esthetic Medicine	Surgical

Excluded societies		
Associazione Medicina Omeopatica (AMO) www.amoecm.org	Omeopathy	Services
Federazione Italiana di Cardiologia (FIC) www.federcardio.it	Cardiology	Services
Federazione Medico Sportiva Italiana (FMSI) www.fmsi.it	Sports Medicine	Services
Fondazione Italiana per il Cuore (FipC) www.fondazionecuore.it	Cardiology	Services
Gruppo Intervento Emergenze Cardiologiche (GIEC) www.giec.it	Emergency Medicine	Services
Gruppo Italiano per lo Studio dei Bifosfonati (GIBIS) www.gibis.org	Internal Medicine	Services
Società Italiana di Ematologia Sperimentale (SIES) www.siesonline.it	Haematology	Services
Società Italiana di Immunologia, Immunologia Clinica e Allergologia (SIICA) www.siica.it	Internal Medicine	Services
Società Italiana di Medicina di Emergenza Urgenza (SIMEU) www.simeu.it	Emergency Medicine	Services
Associazione Italiana Odontoiatri (AIO) www.aio.it	Dentistry	Surgical
Nord Italia Transplant (NITp) www.nitp.org	Surgery	Surgical
Società Italiana di Artroscopia (SIA) www.siaonline.it	Orthopaedics	Surgical
Associazione Anestesisti Rianimatori Ospedalieri Italiani (AAROI - EM.A.C.) www.aaroi.it	Anesthesiology	Clinical
Associazione Italiana di Neuroradiologia (AINR) www.ainr.it	Radiology	Clinical
Fondazione Giovanni Lorenzini - Medical Science Foundation www.lorenzinifoundation.org	Internal Medicine	Clinical
Società Italiana di Farmacologia (SIF) www.sifweb.org	Pharmacology	Clinical
Società Italiana di Nutrizione Umana (SINU) www.sinu.it	Nutrition	Clinical
Società Italiana di Riabilitazione Psicosociale (SIRP) www.riabilitazionepsicosociale.it	Others	Clinical
Società Italiana di Ultrasonologia in Medicina e Biologia (SIUMB) www.siumb.it	Radiology	Clinical
Società Italiana Tossicodipendenze (SITD) www.sitd.it	Psychiatry	Clinical
Società Medica Bioterapica Italiana www.smbitalia.org	Omeopathy	Clinical

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Page 3
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Page 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 5,6
Objectives	3	State specific objectives, including any prespecified hypotheses	Page 6
Methods			
Study design	4	Present key elements of study design early in the paper	Page 6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 6,7
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Page 6,7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Page 7,8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Page 6-8
Bias	9	Describe any efforts to address potential sources of bias	Page 8
Study size	10	Explain how the study size was arrived at	Page 6 and page 12
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Page 8,9
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Page 8,9
		(*b*) Describe any methods used to examine subgroups and interactions	Page 9
		(*c*) Explain how missing data were addressed	Page 12
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	Page 9
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Page 12
		(b) Give reasons for non-participation at each stage	The study did not involve human subjects. However, the reasons for exclusion of some medical societies are explained in page 12
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	We analysed medical societies and their characteristics are described in Page 11, 12 and Supplementary File 2.
		(b) Indicate number of participants with missing data for each variable of interest	Page 12
Outcome data	15*	Report numbers of outcome events or summary measures	Page 10- 12
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Page 9
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Page 16 and Supplementary File 1
Discussion			
Key results	18	Summarise key results with reference to study objectives	Page 18
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Page 22-24
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from	Page 18-23

		similar studies, and other relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 23-24
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Page 25

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Correction: *Conflict of interest between professional medical societies and industry: a crosssectional study of Italian medical societies' websites*

Fabbri A, Gregoraci G, Tedesco D, *et al*. Conflict of interest between professional medical societies and industry: a crosssectional study of Italian medical societies' websites. *BMJ Open* 2016;6:e011124.

In the Methods section it states: *'It is also worth mentioning that Italian medical societies are regulated by a Law Decree that was approved by the Ministry of Health in May 2004.'* However, the Decree was revoked by the Constitutional Court on 9th October 2006 (Judgment n. 328).

BMJ Open 2016;**6**:e011124corr1. doi:10.1136/bmjopen-2016-011124corr1